

REPORT OF THE
NATIONAL COMMISSION ON
AGRICULTURE
1976

PART XIV
PLANNING, STATISTICS
AND
ADMINISTRATION



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PREFACE

The Report of the National Commission on Agriculture comprises 69 chapters in 15 parts. A complete list of chapters and parts is given in pages (iii) to (v). The Terms of Reference of the Commission and its composition are given in Part I—Chapter 1—Introduction.

This volume entitled 'Planning, Statistics and Administration' is Part XIV of the Report and is divided into the following five chapters:

- 60. Planning
- 61. Statistics
- 62. Administration
- 63. Farmers' Organisation
- 64. International Cooperation

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PLANNING

1 INTRODUCTION

60.1.1 Among the developing countries, India is a pioneer in planning for economic and social development. As early as 1938 planning was recognised as a powerful instrument for economic and social change by the Indian National Congress. Soon after Independence the National Government adopted economic planning as a principal policy for development of the national economy. The country has already implemented four five year plans and three annual plans. The Fifth Five Year Plan is being implemented since April 1974. Agriculture along with irrigation and infrastructure have received priority in all the plans, though there were shifts in emphasis as between agriculture and other sectors of the economy in the overall scheme of development. Due to the pragmatic approach in Indian planning it has been possible to make the necessary changes in priorities and policies from time to time and from plan to plan. This has imparted to the development process the desired flexibility.

60.1.2 The experience of planning in the field of agriculture during the last twenty five years, however, suggests some urgent and essential organisational and directional changes in the planning process and a reorientation, in the outlook of the planning machinery at different levels. Examination of these issues is the primary concern in this chapter. Besides presenting a brief account of the genesis of Indian planning, the organisational set up and the process of plan formulation and implementation, the chapter focuses attention on the need for a new approach to agricultural planning. Developing from the level of villages, plans should concretise in the form of projects/programmes and inter-sectoral coordination in the different water-sheds and agro-climatic regions and get integrated at the State level within the framework of the national plan. Such an approach facilitates not only fuller development and utilisation of local resources but also the involvement of various sections of the community. The district emerges as the crucial unit of planning for agricultural production at the operational level. It needs to be

provided with an adequate machinery for plan formulation and implementation. Agricultural planning in our view should be an instrument not only for maximising production but also for promoting balanced regional growth and spreading the benefits of development particularly among the weaker sections of the community. Towards this end the requisite infrastructure and institutional support has to be provided.

2 HISTORICAL BACKGROUND

60.2.1 The first effort at economic planning in India was non-official in nature. The National Planning Committee was appointed in 1938 by the Indian National Congress. Official efforts began in this direction in 1943 when a Reconstruction Committee of Council was constituted with the Viceroy as President. The Second Report on Reconstruction Planning (1944) by this Committee was in the nature of a preliminary economic plan covering all major sectors of the economy. In 1944 Government of India created the Department of Planning and Development for coordinating the plans prepared by various departments of the Central and Provincial Governments and Princely States. Immediately after assumption of office by the Interim Government in September 1946, it appointed an Advisory Planning Board to examine and review the major problems of post-war reconstruction.

Planning Commission

60.2.2 After Independence the Planning Commission was set up in March, 1950. The major functions assigned to it were:

- (i) to make an assessment of the material, capital and human resources of the country and investigate the possibilities of augmenting such of these resources as are found to be deficient in relation to the nation's requirement;
- (ii) to formulate a plan for the most effective and balanced utilisation of national resources;
- (iii) to determine priorities, define the stages in which the plan should be carried out and propose allocation of resources; and
- (iv) to appraise, from time to time, the progress achieved in the execution of the plan and recommend suitable adjustments of policy and programmes.

60.2.3 The Resolution setting up the Planning Commission

stated that planning was intended "to promote a rapid rise in the standard of living of the people by efficient exploitation of the resources of the country, increasing production and offering opportunities to all for employment in the service of the community". Being committed to the welfare of all sections of the community and to the objectives of equality of opportunity for all, India's Plans serve as instruments for achieving the ultimate goal of "socialistic pattern of society". Planning in the country, in fact, derives its relevance and sanction from the 'Directive Principles of State Policy', laid down in the Constitution.

60.2.4 Each Plan puts forth a scheme of investment alongwith a policy frame including institutional changes designed to achieve specified objectives both overall and sectoral. Policies and programmes for agricultural development have been an integral part of the overall plan-frame. The major objectives of agricultural development under the successive five year plans have been:—

- (i) achieving self-sufficiency in foodgrains;
- (ii) increasing agricultural production to meet the needs of industry and exports;
- (iii) diversifying the rural economy with stress on animal husbandry, dairying and fisheries; and
- (iv) improving the levels of living of the farm community which constitutes the bulk of the population.

Agricultural Production Policies

60.2.5 The policy adopted in crop production in the early stages was to organise the effort on as wide an area as possible. The Grow More Food Campaign (GMF) launched in 1942 was the first major effort for increasing agricultural production. The emphasis under the Campaign was on schemes designed to increase the area under foodgrains, both by extension of cultivation to fallow and cultivable waste lands and by diversion of area from cash crops to food crops. Schemes for increasing the yield per hectare by way of provision of irrigation facilities and popularisation of the use of manures, fertilisers, improved seeds etc. were also sanctioned by the Central Government.

60.2.6 The strategy of agricultural development adopted under the First and Second Five Year Plans was broadly in terms of extension of area under cultivation and increase in yields through larger use of improved inputs. Stress was laid on general programmes of development, such as creation of additional facilities for

irrigation, soil conservation, land reclamation and development and measures to increase supply of material inputs like fertilisers, seeds etc. Model schemes such as "Seed Multiplication Farm" were prepared and sent to States for adoption. Financial assistance was given to States on a schemewise basis. Reliance was placed on the programmes of Community Development and National Extension Service to achieve rural development through people's participation and initiative. It was envisaged that these programmes would bring about a qualitative improvement in all fields of agricultural development particularly crop production.

60.2.7 A significant shift from the extensive approach was made in 1960-61 when the Intensive Agricultural District Programme (IADP) was taken up in a few selected districts. Under this programme simultaneous attention was given to the use of package of inputs namely quality seeds adequate dose of fertilisers and plant protection measures. The arrangements for extension effort as also for supplies of inputs and credit were strengthened. Subsequently in 1964 the package approach adopted under the IADP was extended to a larger area under a slightly modified and extended version of the IADP called the Intensive Agricultural Areas Programme (IAAP). While both these programmes followed the same basic approach to crop production, in the IADP districts staffing was more intensive, credit and marketing received greater attention and package of improved practices was recommended for all important crops. Under IAAP, importance was attached to increasing production of major foodgrains only.

60.2.8 To meet the situation caused by the severe droughts of 1965 and 1966 a new strategy for agricultural development was evolved and put into operation in 1966-67. Greater emphasis was laid on increased application of science and technology for raising agricultural productivity. The new strategy involved a substantial step up in the expenditure by farmers on improved cultural practices. It envisaged a considerable expansion of institutional credit for financing schemes of minor irrigation including ground water development and land improvement. Keeping in view the varying impact of development schemes on different sections of the society and on different regions, the Government introduced special schemes for the benefit of weaker sections and backward areas. Important among them were the projects for setting up Small Farmers' Development Agencies (SFDA), Marginal Farmers and Agricultural Labourers' Agencies (MPAL) and programmes for development of drought prone and dry land farming areas.

60.2.9 The Fourth Plan set forth two other important objectives;

(a) to provide the conditions necessary for a sustained rate of growth of about 5 per cent over the next decade; and (b) to enable as large a section of the rural population as possible to participate in development and share its benefits. Accordingly, the priority programmes of development in the crop husbandry sector in the Fourth Five Year Plan were broadly categorised into: (a) those which aim at maximising production; and (b) those which aim at remedying imbalances. Removal of poverty and attainment of economic self-reliance are the two strategic goals that the country has set before itself and the development perspective covering the period 1974-75 to 1985-86 envisaged under the Fifth Plan formulations has been conceived in that light.

60.2.10 In the sphere of animal husbandry, systematic efforts for development of livestock may be deemed to have started with the initiation of the Key Village Scheme involving simultaneous attention to breeding, feeding and disease control in the First Five Year Plan. A comprehensive scheme called "Intensive Cattle Development Project (ICDP)" was taken up in milkshed areas of major dairy plants in 1964-65, each project covering a population of one lakh breedable cows/buffaloes. The approach adopted under this scheme is similar to that adopted under the package programme approach for crop production and involved simultaneous attention to different aspects of cattle development. An all-India Coordinated Research Project on Cattle Breeding and Buffalo Breeding were initiated in the Fourth Five Year Plan. Genetic improvement of livestock, feed and fodder development, development of marketing facilities and provision of adequate health cover are the principal features of development schemes taken up in the animal husbandry sector. In the field of animal diseases, the outstanding feature of planning was initiation of the rinderpest eradication scheme during the First Plan.

60.2.11 In regard to dairying and milk supply, the development of modern organised dairies began to be given attention towards the end of the First Five Year Plan. The dairy processing plants were linked up with rural milk production through milk collection and chilling centres. Collection of milk was organised through cooperative societies of producers in some cases and through middlemen in others. One of the major projects taken up since 1970-71 with assistance from the World Food Programme is the "Operation Flood." This programme aims at increasing milk supplies in the four metropolitan cities of Bombay, Calcutta, Delhi and Madras as also increasing milk production in 11 States and Union Territories to feed these dairy plants. From the planning point of view this was impor-

tant, for, for the first time, the various aspects of milk production and distribution, the inputs, equipment, organisation and financing were worked out in detail and Project Reports were prepared before the project was taken up for implementation. The Project visualised management of the different aspects of the programme through one organisation, preferably the producers' cooperatives.

60.2.12 The programmes for development of poultry, sheep and pig were more or less on lines similar to those of cattle development. These consisted of organising Intensive Poultry/Sheep/Piggery Development Projects, extension centres, setting up breeding farms, provision of health cover, some arrangements for feed and fodder. Bacon factories were set up for processing piggery products. Marketing arrangements were strengthened for poultry and poultry products and wool. Coordinated research projects were taken on breeding and other aspects concerning different species of animals.

60.2.13 In the fisheries sector, the development schemes covered both marine and inland fisheries. Reliance for increasing catches of marine fisheries was placed on introduction of small mechanised boats and medium sized trawlers, provision of landing and berthing facilities, supply of fishing requisites and development of processing and storage facilities. In the case of inland fisheries, emphasis was on expansion of production of fish seed—fry and fingerlings, encouragement to induced breeding and improvement of village ponds, reservoirs etc. An important scheme initiated in the Fifth Five Year Plan is the starting of Fish Farmers' Development Agencies.

60.2.14 Development of forestry also received increasing attention from plan to plan. Physical targets were fixed in respect of individual schemes of economic plantations, plantation of quick growing species, farm forestry-cum-fuelwood plantations, rehabilitation of degraded forests, communications, etc., in the context of overall requirements of industrial wood and fuelwood. One of the important schemes from the point of view of planning undertaken in the Central sector in the Fourth Five Year Plan was the Pre-Investment Survey of Forests Resources, which laid the foundation for further-exploitation and development of forestry resources in the areas surveyed.

3. APPROACH TO AGRICULTURAL PLANNING

Current Approach

60.3.1 The process of plan formation has thus far been one of preparing in the first instance a plan frame at the national level pri-

marily in terms of financial investments by major heads of development in the Planning Commission. This is followed up by an indication of guidelines, both in terms of overall financial allocations to State Government's and priorities to be observed in the formulation of State Plans. The resultant States' proposals were in subsequent discussions between the State Governments and the Planning Commission sought to be integrated into the national level plan formulated by the Planning Commission. In case of important programmes the concerned Central Ministries also circulated model schemes to the States. In India, plan formulation starts from above with a view to balancing investments, overall and sectoral, with available resources, internal and external. The programmes are built up at the State/district levels within the constraints indicated by the Central planning authorities. We are of the view that a more decentralised planning process would facilitate optimum use of regional resources. Also, some indication of resources likely to be made available from above, however tentative, would help planning agencies at lower echelons, formulate and implement plans and programmes with a greater degree of feasibility and realism.

Decentralisation of Planning

60.3.2 Agricultural potential is dependent on the soil, rainfall, temperature and irrigation facilities that are available or can be made available. It is possible to divide the country into homogeneous regions from the point of view of these attributes. Planning of physical infrastructure has to be linked essentially with such regions. Soil moisture is the most important single factor of plant, growth and water management and moisture conservation are best done on watershed basis. Planning for soil-moisture regimen has therefore to be on watershed basis. Further programmes of crop and animal husbandry research and education have also to be planned on the basis of agro-climatic regions. It would thus be obvious that for a large complement of agricultural programmes, the unit of planning will be an agro-climatic region.

60.3.3 There are certain essential characteristics of agriculture which make it necessary to plan some aspects from lower levels e.g. the village, the block and the district. Though farm technology is generally transferable and can be imported and so also labour to some extent, land is a resource which is location-specific. In the case of water it may not always be possible to bring surface water to an area from outside. Ground water too can be utilised only on locations where it is available. Among other resources important

from planning point of view, communications are also location-specific. Besides, agriculture under the new strategy demands a more rigorous planning of time schedules for agricultural operations, scientific water management, prompt diagnosis of pests and diseases and a more efficient system of input supplies and credit along with closer supervision over the various operations, all of which could be attended to more efficiently on a local or area basis. These constraints indicate the need to plan from below certain aspects of agricultural development.

60.3.4 An effective unit for drawing up an integrated plan and budget for agricultural development however is the district. Different programmes in the field of land development, irrigation, input supplies, crop production and development of animal husbandry, fisheries and forestry can be brought together into a single plan at this level. It is also at this level that coordination of inter-sectoral plans should be effected. Thus while agricultural schemes and programmes can be built up from below wherever necessary and feasible, planning in the real sense should be done at the district level. We have discussed the set-up at the district level for handling planning and coordination functions in Chapter 62 on Administration. It is however, important that the water-shed and regional aspects receive due attention and the planning efforts at these levels in regard both to formulation and implementation are effectively coordinated and integrated with such efforts at the district and State levels.

60.3.5 The Indian village with its compact organisation of agricultural production, animal husbandry and village industry has always been the basic unit of the rural economy. Gandhiji realised its key position when he postulated the concept of self sufficient village. Commercialisation of agriculture has, however, brought about significant changes in the attitude of the villager and in his position in the rural set-up. Even so the fact remains that farming practised in a large number of villages is highly traditional and aims at self-sufficiency for the village as a whole. Animal husbandry is built up mainly as a support to the village economy. Labour is generally immobile and the village community is by and large bound up with agricultural prosperity of the village. Agriculture being an individual enterprise, unless the village community is made to participate in development programmes, any effort for planning agricultural development from above is likely to bypass the actual producer.

60.3.6 With the decline of village community, it is difficult to main'ain distributive social justice based on the concept of social responsibility. Had the socio-economic structure in the village been

village community leadership has disappeared in a large measure, interest been maintained the task of agricultural development on village basis would have been more easy to organise. Though the cohesive village community leadership has disappeared in a large measure, traditional ideas of cultivation still persist, as also immobility of labour. It is still possible to put before a village a development plan based on scientific agriculture which can give benefits to all sections of the community. Such a programme for the whole village development has been postulated in our Interim Report on Whole Village Development. This concept however, requires a strong and devoted leader who can counter initial reaction of the vested interests to the programme. As such a leadership is difficult to be forthcoming, large scale translation of this idea of village planning into practice does not appear to be feasible in the immediate future. Nevertheless we strongly recommend that this approach in planning needs to be pursued in all seriousness even though on a pilot basis.

60.3.7 With the transformation in the socio-economic structure of the village and the dilution of economic functions of the village community leadership as also the obvious organisational and other constraints, the process of agricultural planning cannot be decentralised to the village level. However, it is still essential that any plans based on an area approach in terms of large water-sheds or agro-climatic regions should take the village as a nucleus. Farmers' participation in such a plan has to be mobilised by the agricultural extension organisation with the necessary help from other field organisations. The main difficulties which can be foreseen in developing this approach would be:

- (i) changing the traditional attitudes of the farmers in the area to adopt the new scientific agriculture;
- (ii) enabling small and marginal farmers in the area to take part in the programme by providing the necessary loans and crop finance; and
- (iii) providing a responsive extension organisation which can render almost individual service to the farmers in the area.

By and large the success of this approach would hinge upon the extent to which the credit and extension support needs of the small and marginal farmers joining an area development programme could be met. Since this is the back-bone of our approach towards agricultural planning we went into the question of providing an integrated organisation for sub-serving this need in our Interim Report on Credit Services to Small and Marginal Farmers and Agricultural

Labourers. The Commission has recommended the concept of a Farmers' Service Society (FSS) which can both deal with the credit problems on an area basis and provide the responsible extension organisation under the control of the Society itself. The experience of the Tudiyalur Cooperative Society in Coimbatore district of Tamil Nadu shows that a multi-purpose society which is development oriented can be very useful in putting across the message of scientific agriculture to the farmers of the area and also in organising new programmes of agricultural development in a short time. The large scale translation of the concept of the FSS into the field can help detailed area planning and development and give the nucleus at the local level for translating national ideas into action. We recommend that as an early spread of the concept will help substantially in area planning and implementation, this should be done.

Approach to Special Areas

60.3.8 Normally a regional approach which takes into account uniformity of soil, rainfall and temperature should be able to deal with all the water-sheds in the region on a fairly uniform basis. Only where irrigation is superimposed on the rainfall pattern of the region, will a different approach be necessary for agricultural planning. The difference will arise on account of the augmented availability of water from the irrigation system. As such in the irrigated areas even within a region homogeneous in respect of soil, rainfall and climate, different approaches would be necessary towards agricultural planning depending upon the extent of additional water supply available from the irrigation system and its spread over time. This is being stated to emphasise that even under the same agro-climatic conditions, irrigation (and also other developmental measures like soil conservation, land shaping) would lead to a difference in productivity. This requires a careful appraisal of the local development profiles even within the same agro-climatic region. These factors alongwith the general socio-economic conditions of the area would have to be taken note of in detailed planning for production. Broadly speaking we can envisage a regional approach in rainfed agriculture supplemented with an individual approach to irrigated areas in the region.

60.3.9 For detailed planning a region would be an unwieldy unit specially because our administrative systems are concentrated at the district. Officers of various disciplines and institutions who have to take a decision in every field of action are generally available

at the district level. We have already observed that the district is an effective unit of planning for agricultural production. It, however, needs support from the taluka/block levels. Therefore if a region extends over more than one district, a plan of action can be drawn up for a region by discussion between the concerned district groups leaving the details to the district organisation.

60.3.10 In canal irrigated areas, agricultural planning requires a command area approach. There, the cropping programme will depend mostly on the capacity of the irrigation system to provide water for raising crops in the different seasons taking into account the effect of soil and climate on crops under irrigated conditions. As a variety of crops can be raised under irrigated conditions, it gives considerable flexibility in crop planning for the area. In preparing plans for the district, therefore, the irrigated areas come in handy in apportioning proper emphasis on various crops.

4 PLANNING PROCESS

Formulation of the National Plan

60.4.1 Planning in India, as elsewhere, is essentially a backward and forward process—an exercise in successive iterations. The steps in the formulation of a development plan include: setting up of a target of overall economic growth; working out details of this target in terms of private consumption, gross investment, government expenditure, exports etc.; projecting the output and other economic magnitudes by major sectors of the economy and by regions; and preparing programmes and projects within the framework of aggregate and sectoral levels.

60.4.2 In the light of the economic, social and political objectives of the Government, the Planning Commission lays down general guidelines for the development of the economy over a relatively long period, say 10 to 15 years, after a careful study of the possibilities. In the content of such a Perspective Plan, work on the preparation of Five Year Plans is undertaken. This process begins two or three years ahead of the commencement of the five year plan. The first stage is devoted to collection and analysis of basic data, review of existing programmes, working out of priorities and formulation of broad policies, strategy and programmes. This work is undertaken through a large number of working/planning/steering groups in the Centre and the States. The second stage involves the spelling out of the objectives and strategy to be adopted in the plan. For this

purpose a draft outline of the five year plan is prepared by the Planning Commission for the approval of the National Development Council under the chairmanship of the Prime Minister. The Planning Commission also holds discussions with various organisations and interests on the draft outline. The third stage relates to concretisation of the plan and determining the quantitative aspects. This involves detailed discussions about the programmes of work and the financial resources available with the States and the Centre. Among the notable features in this stage may be mentioned the determination by the Committee of Chief Ministers of the National Developmental Council of the manner in which the Central assistance is to be distributed among the States and fixation of the quantum of Central assistance for the State plans. Physical programmes and the financial resources available are then discussed with the Chief Ministers of the States as also with representatives of the Central Ministries and finally in the Union Cabinet and the Parliament. These are, in brief, the important stages of the formulation of a five year plan in general.

Agricultural Sector Plan

60.4.3 The Agricultural sector plan is drawn up as part of the overall process of plan formulation within the framework of priorities and rate of growth of the overall economy indicated by the Planning Commission. For the formulation of the Fifth Five Year Plan, a Steering Group on Agriculture, Irrigation and Allied Sectors was set up by the Planning Commission in March 1972 under the chairmanship of the Minister of State for Planning. The Steering Group was to identify the subjects for which working groups/task forces were required to be set up to undertake in depth studies of problems connected with formulation of Fifth Plan in respect of agriculture, irrigation and allied sectors and to determine their scope of work and composition. The Steering Group was also to indicate broad guidelines to the working groups/task forces and to review the progress of their work from time to time. It was also required to consider the reports of the various working groups/task forces and wherever necessary make suitable recommendations to the Planning Commission for further consideration. In the light of the decisions taken by the Steering Group the then Ministry of Agriculture* set up Working Groups for the following subjects:

- (i) agriculture (crop production);

*Now Ministry of Agriculture and Irrigation.

- (ii) land and water development;
- (iii) agricultural pricing, marketing processing and storage;
- (iv) animal husbandry and dairying;
- (v) fisheries;
- (vi) forestry;
- (vii) cooperation;
- (viii) community development and panchyati raj;
- (ix) land reforms; and
- (x) rural development and employment.

The Working Groups composed of Central Government Officers at the technical and secretariat levels drawn not only from the Departments of Food and Agriculture but also from other departments concerned with allied fields like cooperation, irrigation and power, etc. The intention in constituting these Working Groups is largely to enable the pooling of all available knowledge and experience and permit the consideration of various problems in detail.

Annual Plans

60.4.4 Within the framework of a five year plan annual plans are drawn up taking into account the resources actually available from year to year. Around September each year the Planning Commission indicates to the State Governments the important objectives towards which the plan for the following year is to be oriented, intimates the order of Central financial assistance the State Governments could expect and asks for the draft proposals within the general frame of the States' five year plans. States are also asked to furnish proposals for raising additional resources to finance their plans in accordance with the resources and targets of the five year plan. Usually in November—December every year there are a series of consultations between the Planning Commission on the one hand and the Central Ministries and the State on the other for formulation of the annual plan for the ensuing financial year. During these consultations, progress of the plan of the preceding year is reviewed and the plan for the next year is formulated in the light of the resources available and technical feasibilities of different programmes as proposed by the State Governments. A similar exercise is undertaken in the Central Ministries in regard to the formulation of annual plans in the Central sector.

60.4.5 As in the case of five year plans, the annual plan proposals of the State Governments for the agricultural sector are generally considered by the working groups constituted in the Ministry of

Agriculture and Irrigation. The working groups have their own sub-groups to consider individual programmes of development. The mechanism of annual plans has been considered to be quite useful in the sense that work on certain schemes which deserve greater attention gets accelerated in this process. The process of inter-departmental and Centre-State consultations also facilitates removal of bottlenecks and difficulties experienced in the implementation of various schemes through the initiation of remedial measures in the fields of financing, extension and research. The annual plans are, thus, the main operational instrument of the five year plans and lie closest to the stage of implementation. The mechanism of annual plans introduces, on the one hand, the much needed flexibility in the implementation of the five year plan and on the other, sets out the programmes of development to be implemented every year in sufficient detail.

State Plans

60.4.6 Regarding plan formulation at the State level, a time schedule is fixed by the Planning Commission for discussion with the State Governments. Before they come up for discussions with the Planning Commission, the State Governments analyse and finalise their approach towards the five year plan after consulting their planning and the concerned development and finance departments. The working groups constituted by the State Governments examine these proposals in the context of a critical assessment of the achievements of the previous plan. The report of the working groups is considered by the State Governments in consultation with the State Planning Board or the State Advisory Committee as the case may be. The plan is then submitted to the State Cabinet. The plan thus approved goes to the Planning Commission for discussion.

60.4.7 The State draft plans are examined by the Planning Commission in consultation with the Central Ministries through the mechanism of working groups. The draft plans are finalised by the State Governments in the light of discussions with the Planning Commission. The final State plan documents which emerge are communicated to the Heads of Departments concerned for submitting plan schemes for approval of the Government. The Heads of Departments submit proposals for annual plans in conformity with the five year plan. The procedure for processing of annual plans is broadly similar to the one described above for the formulation of the five year plans. The Planning Department in the secretariat directs the whole process of the formulation of these plans at the State level

Central Assistance

60.4.8 The schemes included in the plan could be classified into the following three categories:

- (i) Central plan schemes;
- (ii) Centrally sponsored schemes; and
- (iii) State plan schemes.

The Central schemes are implemented by the Central Government either directly or through its attached and subordinate offices or through non-official agencies. These schemes are shown in the Central plan of the Ministry of Agriculture and Irrigation. The Centrally sponsored schemes are those which are sponsored and financed by the Central Government but are executed by the State Governments. These form a special category and only schemes which fulfil the following criteria are sponsored:

- (a) schemes relating to demonstrations, pilot projects, surveys and research;
- (b) schemes which have a regional or inter-state character;
- (c) schemes which require a lumpsum provision to be made until they could be broken down territorially; and
- (d) schemes which have an overall significance from the all-India level.

60.4.9 The State plan schemes are implemented by the State Governments and are included in the State agricultural sector plans. The States are free to sanction and implement State plan schemes, once they are approved during the annual plan discussions. During the First and the Second Five Year Plans, the State plan schemes were financed by the States entirely from their own resources. From 1963-64 onwards, the Central assistance to States for agricultural programmes was earmarked. However, the plan schemes under different heads of development had their own patterns of assistance and the States could draw their grants and loans accordingly. Another feature of this system was that the States which were financially better off were able to obtain a larger proportion of central assistance in the form of grant even though the total quantum of financial assistance from the Centre might be less in comparison with the less advanced States. For, the former could adopt, in view of their comfortable revenue position, such schemes as would attract larger

amounts of grants. ¹ The schematic pattern of assistance was discontinued during the Fourth Five Year Plan. The Central assistance is now not related to any specific scheme or programme under the State plans but is given to States through block grants or block loans. Each State gets a fixed proportion (30 per cent) of Central assistance in the form of grant and balance (70 per cent) by way of loan. In the case of agricultural programmes care is taken to see that the earmarked outlay is not diverted to other heads of development.

60.4.10 It is necessary to assess the total financial resources likely to be available for agricultural development in the form of plan allocations and committed non-plan funds as also from institutional resources. We recommend that the planning machinery in the States and at the Centre should make a continuing assessment of the needs and supply of total investment resources for the different sectors from plan as well as non-plan sources, and the plan programmes for agricultural development should be drawn up on the basis of this assessment for optimum utilisation of the total available financial resources.

60.4.11 There can be no two views on the need for agricultural plans being based on realistic assumptions and not suffering from any inconsistencies. The general experience has been that the States prepare draft plan proposals without due regard to the limitation of the financial resources and during the course of discussions with the Planning Commission, these proposals have to be pruned to a considerable extent. One result is that size of the States plan and the provision for individual programmes included therein remain uncertain. In the process of pruning during the State plan discussions, it is likely that some times important schemes get lower allocations. There is also the possibility that plan priorities get distorted if the pruning is on a large scale. We consider that it is essential to have a closer coordination and understanding on methodology, approach and basic assumptions for formulation of plan proposals among the various working groups at the Centre and in the States. There should also be a greater involvement of representatives from States with field experience as well as non-officials, like agricultural economists, scientists and progressive farmers in these working groups.

60.4.12 The procedure for formulation and administrative approval of Centrally-sponsored schemes also needs to be simplified. Larger discretionary powers could be given to the Ministry of Agriculture & Irrigation in issuing administrative approval and expenditure sanction of approved centrally sponsored schemes. Further,

¹ Planning Commission, Fourth Five Year Plan 1969—74, July 1970, Page 55, New Delhi.

while approving the model schemes, the States should be given freedom to adjust the details within the broad objective of the model schemes.

5 PLAN IMPLEMENTATION

60.5.1 Proper and timely implementation of the plans is of the utmost importance in the planning process. If the scheme of allocations embodied in the five year plan is broadly adhered to in the annual plans, subject to adjustments which are deemed necessary from time to time, and resources are mobilised on the lines indicated in the plan, the desired objectives could be ensured.

Problems of Implementation

60.5.2 It has been observed that the major weaknesses in agricultural plan lie at the implementation stage. Sometimes sanctioning of new schemes takes a long time merely because of the procedural delays involved in inadequate decentralisation of powers. In some cases, the delay is also due to the lack of sufficient details when the schemes are formulated or their incomplete preparation. Further, some of the schemes have to be approved each year after the budget is approved by the State Legislature. Pending this approval, no preparatory work could be taken up. The preparation of detailed schemes is absolutely necessary for convincing the Finance Departments both at the Centre and in the States about the feasibility and desirability of the proposals. It has also been found that when programmes were not drawn up in sufficient detail, results achieved after their implementation were different from those originally contemplated. It was, for example, noticed during the Fourth Plan that some of the programmes taken up for the benefit of the poorer sections of rural population, in fact benefited other classes of persons also as the necessary checks and balances were not fully spelt out. The Draft Fifth Plan has, therefore, emphasised the need for detailed formulation of the projects and programmes and also enumeration of checks and balances and the supervision of these in some detail in order to achieve the desired objectives. We fully support this view and recommend that the schemes should be drawn up in sufficient detail so that they could be taken up as soon as the Plan is approved for implementation by the concerned authorities.

60.5.3 Greater decentralisation of powers and delegation of
3 Agri.—3

authority are also necessary for effective implementation of plan projects. It is stated in the Draft Fifth Plan that one important field where the need for substantial freedom of decision and action is keenly felt is the Area Development Programmes which have been introduced in a big way in the Fifth Plan. The Draft Fifth Plan formulations include a number of measures for expediting the process of decision making in respect of these programmes. It is, however, necessary that in respect of other programmes included in the agricultural plan, a careful review should be made of the current procedures and as far as possible, the powers of decision making should be decentralised.

Progressing and Evaluation

60.5.4 Continuous evaluation and appraisal of the progress are essential for ensuring successful implementation. A multiplicity of agencies are at present concerned with making appraisal of plan schemes, viz., (a) programme authorities incharge of execution; (b) Ministry of Agriculture & Irrigation and (c) Planning Commission. The Planning Commission calls for a progress report on the implementation of various agricultural programmes in the preceding year both from the State Governments and Central Ministries. On the basis of this information, the Planning Commission prepares a progress report. In addition, progress reports of individual projects involving large outlays are also prepared by the Central Ministries and concerned States. The progress of Central and Centrally-sponsored schemes in different subject-matter fields is reviewed on a quarterly basis in the meetings held by senior officials of the Ministry of Agriculture & Irrigation.

60.5.5 Scientific evaluation has been one of the weakest links in Indian planning, and has hampered the implementation of the development programmes. Though some kind of evaluation machinery does exist in the Planning Commission/Ministry of Agriculture and Irrigation, its organisation is inadequate and weak. Apart from the weaknesses of evaluation machinery itself, the evaluation has been ineffective because of inadequacy of coverage, delay in carrying out the studies and the timelag between the completion of the study and finalisation of the report. The need for an effective monitoring and evaluation (M&E) process to assist the implementing agencies in ensuring that optimum use is made of facilities which have already been created and that any new projects which are undertaken are executed on time and within the cost estimates, has been recognised in the Draft Fifth Year Plan. It has been envisaged that

an effective M & E system would not merely keep the implementing agency adequately and promptly informed about the progress of the projects but would give advance warning in respect of areas where potential bottlenecks or shortfalls are likely to arise so that adequate remedial measures could be taken, in time.

60.5.6 Apart from evaluation and appraisal of projects by the Government departments, we recommend that evaluation through independent and autonomous bodies like the agricultural universities and research institutes should also be encouraged. The evaluation should be concurrent and continuous. The Centre can also undertake pilot studies at selected points for specific purposes.

60.5.7 The patterns of Central assistance for individual schemes/projects were in vogue till the middle of the Third Five Year Plan. The release of Central assistance was, therefore, intimately tied up with the progress of expenditure on these schemes. This arrangement facilitated submission of periodic progress reports. Individual schemewise patterns of Central assistance were, however, dispensed with subsequently and reporting of progress on individual schemes was no longer tied up with the release of Central financial assistance. We consider that such reporting of progress on individual schemes/projects is necessary in the interest of effective plan implementation and that the quality and coverage of reporting progress of individual schemes will improve with the setting up of the planning units at the different levels suggested in this Chapter.

60.5.8 Another point worth mentioning is that at the time of formulation of annual plans, though it is claimed that progress of individual schemes or a group of schemes is reviewed, in actual practice this does not happen. The State Governments do not furnish full information in regard to progress of even major schemes included in the State plans. This is a serious gap which deserves attention. Suitable information and reporting systems need to be evolved so that those responsible for implementation can anticipate difficulties, judge at each step the progress and performance in relation to pre-determined targets and take corrective measures.

Need for Coordination

60.5.9 Apart from marshalling of relevant data, provision for coordination and synchronisation of various aspects of a development programme is necessary for its proper implementation. The programme for increasing agricultural production comprises a large number of schemes and projects, some of which are directly related

to agricultural sector, such as supply of seeds, fertilisers and pesticides, introduction of improved practices and implements, etc.; and some having a close bearing on agricultural performance like soil conservation, exploitation of water resources, development of communications and power, supply of credit, institutionalisation of marketing, provision of processing facilities and guarantee of minimum support prices. These schemes fall under the administrative control of more than one department and require to be coordinated if the thrust and direction of the development effort are to be ensured.

60.5.10 Since the inception of the Third Five Year Plan, certain steps have been taken towards improving administrative coordination in matters relating to agricultural development. Coordination committees at Cabinet and secretariat levels have been set up in the States where decisions having a bearing on the coordinated working of the Departments of Agriculture, Irrigation, Revenue, Animal Husbandry, Fisheries, Forestry, Cooperation, Community Development, etc. are taken. In a number of States the posts of Agricultural Production Commissioners or Special Secretaries responsible for coordinating the activities of the above mentioned departments have been created. At the Centre, an Agricultural Production Board was set up to coordinate policies and ensure expeditious implementation of agricultural programmes. This Board has now been replaced by high-powered committees/boards/councils on important subjects like commercial crops, research, inputs, etc. At the apex, a Cabinet Sub-Committee on Agriculture, Food and Rural Development holds the responsibility for coordinated functioning of various departments involved in implementing programmes of development in the agricultural sector.

60.5.11 Another notable feature is the setting up of joint Central teams comprising officers from the Ministry of Agriculture and Irrigation and Planning Commission. These Teams visit different States every year to review the progress of agricultural programmes and formulate detailed proposals for their improvement in the light of priorities of development and availability of resources. This gives an opportunity to streamline the working of various important schemes included in the State annual plans. For purposeful pursuit of the planning process it is necessary that the recommendations of the Central teams are reflected in actual implementation of the various programmes. We hope that it would be possible to follow up the recommendations of the Central teams in a more organised manner when the planning units proposed in this chapter have been set up at different levels.

6 PLANNING MACHINERY

Apex Organisation

60.6.1 The Planning Commission is the kingpin of planning machinery in the country and has the overall responsibility both for formulating the plan and watching progress of its implementation at the national level. In this task it is assisted by the planning divisions of the Central Ministries and attached organisations. In many cases important policies and programmes originate in the Ministries and the Planning Commission's task in such cases is of providing guidelines to the concerned Ministries so that it is possible to integrate the policies and programmes with the overall plan formulations. In other cases, the ideas originating in the Planning Commission have to be given concrete shape by the Ministries concerned. The necessary coordination between the planning work done in the Ministries and the Planning Commission is carried out through the planning units set up in the Ministries and through the working groups set up at the time of plan formulation. The Programme Administration Advisers in charge of groups of States on regional basis, located in the Planning Commission, also render assistance to its Members in matters requiring field study and observations.

60.6.2 The subject-matter divisions in the Planning Commission are concerned with the formulation of detailed plans and programmes in the respective sectors. For example, the Agriculture and Rural Development Division is concerned with agriculture development, minor irrigation, soil conservation, animal husbandry, dairying, etc. and keeps close contact with the Ministry of Agriculture and Irrigation dealing with those areas of development at the Centre. Its function is to ensure that the proposals formulated by the States and the Ministry of Agriculture and Irrigation are integrated into the national plan of agriculture in the framework of financial allocations and priorities laid down by the Planning Commission.

Machinery in Ministry of Agriculture and Irrigation

60.6.3 In the Department of Agriculture of the Ministry of Agriculture and Irrigation, the Plan Coordination Division of the Directorate of Economics and Statistics (DES) is responsible for the organisation and coordination of the work relating to the formulation of five year plans and annual plans in the agricultural sector. The Plan Coordination Division is headed by Joint Commissioner who

works under the Additional Secretary (Coordination) of the Department of Agriculture. The Division scrutinises the draft proposals formulated by the working groups and subject matter specialists in the Department for inclusion in the five year plan, works out the order of priorities and prepares the draft of the overall agricultural plan within the framework of the priorities and objectives indicated by the Planning Commission. The Division also studies the general problems of agricultural planning and development as also prospects for agricultural development. It reviews the progress of various schemes included in the agricultural sector of the plan and coordinates the work pertaining to Central and Centrally sponsored schemes of the Ministry of Agriculture and Irrigation.

60.6.4 Besides the Plan Coordination Division of the DES the Programme Implementation and State Liaison and Plan Coordination Units of the Department of Agriculture look after the coordination of annual progress of the State Plan schemes as reported by the various divisions in the Department of Agriculture. These Sections also coordinate the follow-up action on the recommendations of the Central Teams and maintain liaison with the State Governments. These Units are headed by a Joint Commissioner (State Liaison) who also works under the Additional Secretary (Coordination). The entire planning and coordination work along with administration and budgeting is under the control and supervision of an Additional Secretary in the Department of Agriculture. Thus, besides the Central and Centrally sponsored sectors which are the direct responsibility of the Central Ministry of Agriculture and Irrigation, that Ministry also has the responsibility for directing and coordinating the research and development efforts in the agricultural sector at the State level. The various subject-matter divisions of the Ministry would have, therefore, to develop the most suitable means of having a continuous dialogue with their counterparts in different States, on the emerging problems in the field. Such a dialogue would provide the necessary expert opinion to the State level officers and the feedback on the problems in the field to the Central experts.

60.6.5 In Chapter 62 on Administration we have recommended the creation of a well organised Planning Division in the Ministry of Agriculture and Irrigation to deal with formulation, coordination and evaluation of plans. This Division should function in respect of the entire agricultural sector. The existing Planning Division in the DES should be transferred to the proposed Division. However, it would not be necessary for the Planning Division to have a Statistical Cell of its own since the DES will be able to feed it. Further,

the Planning Division as also the Budget and Finance Division should be placed under the Principal Secretary, Agriculture to enable him to act as an effective leader of the team.

Set up in States

60.6.6 The States have planning departments which coordinate the work of other departments for the preparation of development plans and present reports on the execution of State plans. In some of the States, planning boards have also been set up. The State Planning Department generally receives direction from a Committee of the State Cabinet or from the State Planning Board and is also supported by the State Statistical Bureau. Proposals for strengthening planning machinery at the State level have to be viewed in the context of the functions they are expected to perform. For example, successful implementation of major national policy objectives calls for an organisation at the State level which can coordinate effectively and provide guidance to local democratic bodies and take a wider view of development than is generally possible for individual departments.

60.6.7 Below the State level, there is no regular planning machinery. There is no organisation at the district level coordinating the work of different offices of the agricultural departments and non-officials agencies which are working independently. In most of the States, the coordination among the agricultural development programmes is secured through the District Collector who acts as the Chairman of the district level coordination committee. In some States, a whole-time official of the rank of additional collector is entrusted with the work of coordination or coordination is sought to be achieved through the District Development Assistant. The coordinating agencies in the present set-up have little scope for considering the local problems and priorities which might differ from the blue prints received from above. Even when an agricultural production plan was prepared at the village level by the Panchayats it was more of an exercise done by the official agencies in the context of the financial allocations and blue-prints received by them from the above rather than an embodiment of the expression of the farmers of their problems, needs and methods of solving these problems.

60.6.8 In this system no farmers organisations have had the change to develop for reflecting the needs, the problems and the views of farmers on the policies and programmes for agricultural

production. Those which have come to exist function only at the National or State levels and there was no communication between them and the cultivators on the problems and priorities of the agricultural development process. Sometimes seminars, conferences and workshops are organised at the national, regional and State levels under the auspices of official or non-official organisations to involve farmers in the process of plan formulation or secure their participation in the implementation of plans. However, these media are not effective and according to the Study Team on Agricultural Administration set up by the Administrative Reforms Commission,¹ "appeals to farmers made through these media and the recommendations of these forums have often fallen on deaf ears. Most of the basic problems of farmers still remain to be tackled. It is no wonder farmers have been losing interest in the Government's programmes. In fact, they have developed scepticism towards these plans and programmes..... Without the participation of farmers, the plans are becoming unrealistic and ineffective".

Improvements to Planning Process

60.6.9 Each successive five year plan has sought fresh ways of improving the machinery for plan formulation, implementation and evaluation in the context of four main characteristic features of the Indian situation, namely: (i) the federal set-up of the country; (ii) democratic structure with freedom given by the Constitution to all sectors of the people to function as political parties or as voluntary groups or associations; (iii) predominance of the private sector in agriculture; and (iv) commitment of the country to a policy of social welfare of the community and equality of opportunity.

State-Centre Consultation Process

60.6.10 It has already been emphasised in Chapter 8 on Centre-State Relations in Agricultural Development that the federal set-up of the country makes the development of the right relationships between the Centre and State imperative so that they can work as a part of a single system. Such a relationship has to be ensured through understanding and adjustments and determined on the basis of efficiency and economic viability. We would like to emphasise here that the preparation of a national agricultural development plan through the consultative process between the Centre and the States is the most efficient method of bringing the State plans and programmes

¹Administrative Reforms Commission, Report of the Study Team on Agricultural Administration, Vol. I, September 1967, p. 52, New Delhi.

into conformity with the basic national objectives. This consultative process is also important for building up the commitments of the Central and State Governments to the priorities in the Plan. It may also be stated that an exercise to develop agricultural production technology for distinct agro-climatic regions, however, refined, cannot be the sole determinant of an agricultural plan. The Centre-State consultative process in fact fills the gaps that are inherent in an attempt to prepare a realistic plan on the basis of a technical exercise alone. Further, mutual consultation between the Centre and the States may provide a more reliable basis for planning specially in areas where there are inadequacies of technical and economic data. Due account has also to be taken of varying implementation and administrative capacities and the absence of uniform and consistent implementation of development policies essential for the success of the Plan. In a federal set-up the consultative process will, therefore, always remain the main channel through which the mutually agreed plan and policy framework are evolved.

60.6.11 A number of steps have to be taken to strengthen this consultative process. Under the present system, the Centre does not have complete knowledge about the details of the progress of plan schemes in the State sector. There has to be free flow of knowledge, ideas and experience from the lower to the higher stage of planning machinery and vice-versa, and therefore the consultative process which should start from the lowest level has to be intensive and continuous. The organisational set-up for agricultural planning at various levels namely, the block, district, State and Centre suggested in the Chapter 62 on Administration will have an important role to play in this process. The proposed planning units will be in continuous touch with each other not only in plan formulation but also in the implementation of programmes to facilitate continuous exchange of data and ideas from the lowest to the top level of administration. These units will also function as the main agencies for coordination between the Central and State Governments. It also needs to be mentioned that the present system of monthly or quarterly reviews at the Centre which are being conducted separately in respect of each subject-matter division for Central and Centrally sponsored schemes alone cannot help in the assessment of their contribution to the total development of the sector represented by them. Such reviews will have to be supplemented by integrated sectoral reviews as well as reviews of the total agricultural sector with the support of the proposed agricultural planning units. Such total and integrated sectoral reviews of problems through the planning units will be instrumental in provid-

ing the necessary background and the required priority perspective for the annual plan discussions. In this way the plan could be formulated on a tested and realistic basis in the light of experience of implementation of the programmes gained and evaluated over a period of time.

60.6.12 The consultative process of plan formulation through the system of working groups suffers from certain limitations. The existing organisation and procedure of operation of these groups do not ensure continuous and detailed coordination among them. We have drawn attention to these in Chapter 8 on Centre-State Relations. We have suggested that there is need for representing the State experts on the working groups at the Centre, without making them unwieldy, so that a reasonable consensus might develop. The choice of members will depend more on their individual competence and expertise and not on considerations of regional representation.

60.6.13 People's participation: The democratic structure of the country makes it imperative for planning to be responsive to public opinion. Public participation and cooperation in the planning process have been sought to be achieved right from the First Plan through association of leading non-officials with the formulation and implementation of plans both at the district and the State levels. Amongst others, Members of the State Legislatures and of Parliament came to participate in district development committees and project advisory committees and some of them also served on the State planning boards. To bring about closer association of Members of Parliament with the work of the Central Government, informal consultative committees composed of Members of the Lok Sabha and the Rajya Sabha were constituted, for a number of Ministries towards the end of Second Plan. These consultative committees were associated with consideration of problems of planning in different fields and at different stages. The planning Commission conferred with the consultative committee associated with its work. The Planning Commission also suggested to State Governments that Members of Parliament from each State might be associated with work relating to planning as such association would be of considerable value in carrying out the plan. It was hoped that, in the States, arrangements would be made for informal consultation with Members of Parliament and the State Legislatures for reviewing the progress of the plan and organising the cooperation and support of the people in its implementation.

60.6.14 Information and control system: The Fourth Plan document laid great stress on the importance of developing information and control systems for pursuing the progress of plan implemen-

tation as well as taking corrective action in time. The need for reviewing the procedures and staffing patterns of the planning departments in States for the purpose of pre-investment planning which involved an analysis of the resource potential, identification of programmes and projects and their preliminary formulation to be followed by feasibility studies, covering such aspects as demand analysis, technical developments, cost estimates, profitability analysis and assessment of national economic benefits, was emphasised. It was also mentioned that the existing planning organisation did not provide for detailed study of either performance or the quality of the new proposals from different departments as a result of which integration of one scheme with another could not be ensured at the stage of plan formulation.

60.6.15 The draft Fifth Plan observes that the development of the organisational framework has not kept pace with the increasing variety and complexity of the task that State and Central Governments have taken on. Plan implementation has also been hindered by factors such as rigid compartmentalisation in fields which require a high degree of integrated multi-disciplinary activity, excessively wide or narrow spans of controls, lack of clear lines of responsibility, inadequate delegation of authority and improper relationship and positioning of line and staff functions.

60.6.16 Reorganisation of State-level: In the light of experience gained through working of successive five year plans, steps have been initiated to re-structure the planning machinery with a view to bringing about substantial improvements in plan formulation and implementation. At the State level these relate to reorganisation and strengthening of State planning departments/boards/commissions and setting up of steering groups for selected fields including agriculture and irrigation. The proposals for reorganisation of planning departments at the State level envisage, *inter-alia*, establishment of special units for monitoring plan information, evaluation and project appraisal, which had so far been the weakest areas in the implementation frame. Some streamlining of the Central Ministry in the fields of animal husbandry, fisheries and forestry is also considered necessary for strengthening the set-up for planning at the Centre.

60.6.17 The outlines of a State level organisation which needs to be developed for effective agricultural planning and development has been spelt out in Chapter 62 on Administration. However, it has to be recognised that the all-India or the State level programmes can only lay down the broad objectives of development. These objectives have to be translated into detailed field programmes by the field level

administration which generally consists of three tiers, namely, the district, block or the taluka and the village. These tiers have to be seen as elements of an integrated system in the sense that each tier should support and derive its strength from the other. There may be growth potentialities in the district which are local in character and which have to be exploited through detailed planning at the district level. There is, therefore, need for a strong organisation at the district level which should be responsible for:

- (i) breaking up the policy directives from the State or even the Central level into suitable action programmes;
- (ii) organising and directing the field staff;
- (iii) fixing of detailed targets and standards of performance;
- (iv) progress analysis, supervision and coordination of the implementation of programmes;
- (v) review of procedures and methods of work; and
- (vi) feed-back to the State headquarters organisation.

60.6.18 We are of the view that only a strong planning organisation at the district level will be able to translate the regional/area approach to development particularly in respect of certain aspects of agriculture recommended in this chapter into action. It has therefore been suggested in Chapter 62 on Administration that there should be a separate planning and coordination unit dealing with progress and evaluation of agricultural planning under a Chief Agricultural Development Officer (CADO) who will function as the principal coordinator of all agricultural activities at the district level. There should be a unit at the Block level to watch the progress of agricultural development programmes under the Block Agricultural Development Officer who should be directly responsible to the CADO. The details of this set up have been discussed in that chapter.

7 METHODOLOGICAL PROBLEMS

Target Setting

60.7.1 In the formulation of an agricultural plan, one of the important tasks is the setting up of targets for various agricultural commodities. Several forward and backward exercises have to be done on different assumptions before obtaining the final results. Basically, the targets are determined taking into account the likely demand and supply position of agricultural commodities.

60.7.2 Demand projections: The first step in target setting is the determination of demand for various commodities at the end of

the plan period or at the end of a perspective plan period. Determination of demand is not merely an arithmetic exercise. This has to be done keeping in view the main compulsions faced by the economy in a particular temporal context and taking into account qualitative as well as quantitative factors. Further, the demand may be the final demand for direct consumption items such as food-grains etc. or the derived demand for agricultural raw materials worked backwards from the demand for finished products. The estimates of demand are worked out taking into account the composite effect of increase in population and in per capita income/consumption measured through appropriate income/expenditure elasticities of demand. The projections are usually made assuming no change in the price level. To the estimates so derived, are added the requirements for seed, feed, industrial uses and allowance for wastage so as to get the estimates of total (gross) requirements. Other considerations such as desirable and feasible nutritional levels of diet, changes in tastes and preferences of the people etc. have also to be taken into account in making the demand projections. The methodological problems involved in demand projections have been discussed in detail in Chapter 10, dealing with projections of demand for selected agricultural commodities. We would, however, like to emphasise here that since the demand projections constitute the starting point in any forward looking exercise, it is necessary to constantly review and improve upon the methodology for projections of demand over a perspective period. It may also be added that the degree of reliability of all-India estimates of consumption demand could be greatly increased if the demand estimates are built up from State level estimates. Indicators of growth of demand for different commodities in relation to the level of demand in different States can be developed from the basic data available. We recognise that there are some specific methodological problems and data gaps in building up the demand projections from State estimates. It is necessary to devote resource and expertise towards this task in view of its importance in plan formulation.

60.7.3 Production potential: Having settled the demand, an appraisal of the production potential of agricultural commodities in the country has to be made. This has to be done taking into account the existing technical and organisational facilities as well as those which could be developed within the plan period with or without external assistance. In the case of agricultural commodities the targets are fixed in terms of production potential expected to be created at the end of the plan period, often as an addition to the level

of production reached at the end of previous plan period through measures such as extension of cultivation to new areas and intensive cultivation in selected areas. The latter include the use of high yielding varieties, multiple cropping, creation of additional irrigation facilities, measures for conservation of soil and development of land, increased use of fertilisers and manures and improved cultural practices. The additional production from different programmes is assessed on the basis of the 'yardstick approach' which assumes a simple linear relationship between the increase in output and the level of application of each input. During the first three plan periods, production targets of agricultural commodities were fixed on the basis of this approach. The yardsticks were initially established on the basis of some field experiments at the farm level or, in their absence, on the basis of expert knowledge that was available in the country. Towards the end of the Third Plan period the need for composite yardsticks was recognised in view of the high degree of complementarity among various inputs. This was considered all the more necessary with the acceleration of high yielding varieties programme which involves adoption of a package of practices. The composite yardsticks have been in use since the Fourth Five Year Plan in respect of area covered under the high yielding varieties programme.

60.7.4 'Yardstick' approach: The yardstick approach has been one of the weakest links in agricultural planning. The yardstick is related to a specific dose of a single input even though the inputs are generally used in varying combinations and not in isolation. Even the concept of composite yardsticks is based on the assumption of optimum utilisation of given inputs in selected areas. In practice this may not be so. For example, in the Fourth Five Year Plan the target of rice production was expected to be achieved mainly by extending area under high yielding varieties from 2.6 million hectares in 1968-69 to 10 million hectares in 1973-74. According to the latest statistics, whereas the area under high yielding varieties of rice has been achieved, production fell short of the target significantly. Obviously the yardsticks used for estimating the target were not the correct indicators of the actual input responses under actual field conditions. For this reason, the production targets for different agricultural commodities, particularly foodgrains, fixed for different plan periods, were not realistic. We would emphasise here the need for a realistic assessment of the production potential in the country. For this purpose a careful assessment of the production potential has to be made in respect of different agro-climatic regions.

The rainfall, altitude and latitude, the conditions of soil and seasons in different regions have to be carefully analysed for improvement of biological productivity. Different agro-climatic regions also differ widely in their natural endowments, input levels and institutional and administrative infrastructure. Further, even under the same agro-climatic condition there are differences in productivity depending upon soil fertility, levels of inputs, management and other socio-economic factors. This requires a careful appraisal and complete restructuring of cropping patterns on agro-climatic and other considerations with a view to achieving optimum levels of biological productivity.

60.7.5 Till such time when adequate data base is available for making the appraisal referred to above, the use of yardsticks is inescapable. In order to be more meaningful the yardsticks should be fixed separately for relatively homogeneous group of farms or at least for relatively homogeneous agro-climatic regions. Further, they should be laid down for different crops separately. Yardsticks should be reviewed at the end of each plan period to take account of the technological changes that have occurred during the period. While the yardstick approach would provide rough and ready means for assessing the possible response of various inputs, it is also necessary to check the estimates of production from time to time by actual field surveys. Special surveys during the implementation of plan would also be useful for checking the estimates made at the plan formulation stage. Such surveys should particularly aim at ascertaining the input doses actually applied as against the recommended levels. Information on response factors gathered through such surveys would provide useful correction factors for the yardsticks in use.

60.7.6 In 'modern' agriculture organised on commercial lines, non-farm inputs constitute a substantial proportion of the total investment. It will, therefore, be necessary to involve input/output functions related to various levels of application of inputs. Though it might be possible to derive production functions on the basis of data available from the farm management studies, these functions would not be adequate to depict the different situations occurring in different parts of the country.

60.7.7 The current practice is to lay down firm targets for the five year plan at the all-India level, and then break them up into statewise targets. No attempt is made to indicate the targets at the district/project levels. We consider that specific targets of production should be indicated down to the district/project level, which are the crucial levels of plan implementation. It is also necessary that the time perspective for realisation of these targets should be clearly set and strictly adhered to. This will help in spelling out the schemes

and programmes at the grassroot level required to achieve these targets.

60.7.8 Aggregate output as plan target: Agricultural production is a biological process involving transformation of inputs into outputs. Because of this, it is not always possible to set forth the targets of production in terms of standard responses to various inputs used. The responses to both seeds and fertilisers vary from year to year depending on a variety of both controlable and uncontrollable factors. A major factor influencing production is weather. It needs to be mentioned that it is not merely the total amount of rainfall received, but also its distribution over the period of crop growth, particularly during critical periods, which influences the level of production. Similarly, the number of cloudy days or days of sun-shine, dew and frost and even the direction and strength of winds at critical periods often influence the output. Thus, whereas the output in any given year is influenced considerably by weather factors in that year, fixation of targets is done on normal weather assumptions. Further, at the time of the assessment of achievements against the targets at the end of the year, it becomes difficult to indicate how much of the shortfall or excess of output is due to failure or success of developmental measures and how much of it is due to the effect of weather. In these circumstances targets of production in respect of essential commodities have to be fixed in terms of not merely a single figure of final output but in terms of a range of output or aggregate output during the Plan period. A beginning in this regard has already been made in the draft Fifth Plan document which lays down targets of production of principal crops in terms of aggregate output during the plan period.

60.7.9 Livestock and fish production: The targets of production fixed for livestock and poultry products, fish and wood in the plan have no firm statistical basis at present. These targets are not linked with estimates of economic demand for those products nor to the nutritional requirements. The gap between nutritional demand and available supply was so vast that it was not feasible to aim at achieving the nutritional demands in a few plan periods. The physical programmes and production targets are also not correlated. The concept of yardsticks and production potential has yet to be extended to these products. We recommend that these gaps should be filled and that necessary investigations should be undertaken on a priority basis.

Resource Allocation

60.7.10 Once the production targets are fixed, a judicious selec-

tion has to be made of the development programmes and projects, the objective being to ensure as far as possible optimum allocation of available resources. Technical co-efficients such as capital-output ratio, labour-output ratio and benefit-cost ratio, among others, could provide the necessary criteria for resource allocation. The estimation of capital-output ratio is a difficult task since agricultural production is subject to vagaries of weather and it is not possible to isolate the effect of weather in order to arrive at a normal relationship between capital and output. Further, in view of the new strategy of agricultural production involving use of high yielding varieties and other scientific methods of cultivation, the present technical input co-efficients may not remain constant over time. It is also difficult to frame estimates of investment by a number of farmers in agriculture, particularly when part of such investment is non-monetised. The computation of labour-output ratio also suffers from similar problems. The benefit-cost-ratio, though not faultless, is an efficient criterion for determining whether a project is economically viable or not. In the case of irrigation projects¹, we are of the view that the internal rate of return is a better criterion for evaluating the projects.

Regional Imbalances

60.7.11 The programmes for agricultural development can broadly be classified into five categories *i.e.* those relating to:—

- (i) increase in area under the crop through extension of cultivation to new lands or through multiple cropping;
- (ii) provision of material inputs, *e.g.*, high yielding varieties of seeds, fertilisers, plant chemicals and irrigation;
- (iii) undertaking measures for improvement of agricultural efficiency *e.g.*, soil and water management, research and extension, farmers training and education;
- (iv) provision of economic incentives, *e.g.*, price support, crop insurance, subsidies; and
- (v) undertaking institutional measures, *e.g.*, land reforms, provision of credit, improvement of marketing system, co-operative servicing and farming.

In the ultimate analysis, only the first two items directly contribute to the increase in production. The new strategy of agricultural development, adopted in 1966-67 is mainly dependent on the second item. The stress under the new strategy is on the increasing application of science and technology for raising agricultural productivity. It has been observed that the new strategy of agricultural production

¹Vide Chapter 15—Irrigation, paragraph 15.11.7.

with a promise of rapid development of selected areas has led to accentuation of various imbalances in the form of regional backwardness, neglect of dry areas, uneven spread of new technology between crops and neglect of small and marginal farmers. A systematic identification of areas with low productivity and factors leading to it is a necessary pre-requisite for suggesting measures for improvement of productivity. Obviously, there is substantial scope for improving yield levels in the low productivity areas, given assured irrigation, high yielding technology, necessary inputs and a package of practices designed to give optimum yields.

Farmers' Participation in Programmes

60.7.12 A major difficulty in agricultural planning arises from the fact that agricultural activity is carried on by millions of farmers who take independent decisions. The success of agricultural planning lies in influencing these decisions in a given direction and in successfully bringing around the farmers to adopt the recommended technology and inputs on the desired scale. Farmers have to be motivated first through appropriate incentives to adopt the new technology; they have then to be provided with the technical know-how through appropriate extension techniques, e.g., field demonstrations discussion groups and other audio-visual techniques. The availability of the right type of inputs at appropriate time and within easy reach has then to be arranged. Further, to ensure that these inputs are actually used by the farmers, it becomes necessary to organise credit facilities on an adequate scale. Finally to ensure that the farmers receive remunerative return on their labour and investment, the State has to provide the necessary market structure and facilities. Agricultural planning is, thus, a comprehensive effort starting with an assessment of the potentialities for production, drawing up development programmes to tap this potentiality and creating the necessary infrastructure to ensure the availability of inputs, credit and marketing facilities needed by the farmers. We consider that the farmers' own organisations can further the interest of agricultural development more effectively than a governmental set-up. It will be desirable if the farmers' organisations operate in two separate but complementary wings, one dealing with economic and service functions and the other with promotional and welfare activities. For the former we have recommended in Chapter 55 on Credit and Incentives, the setting up of the farmers' service societies. For the latter we have recommended in Chapter 63 on Farmers' Organisations the setting up of farmers' unions or *krishik sabhas*.

Improvement of Data Base

60.7.13 The Commission also attaches importance to the need for improving the data base for formulation of plans. For estimating the expected contribution of various development programmes to the production potential of agricultural commodities, data on yardsticks of production are required. On the input side, cropwise estimates of consumption of fertilisers, manures and pesticides are needed along with data on dosages applied in relation to the recommended dosages. The water input is of great importance in improving agriculture. Statistics on irrigation by different sources, canals, tanks, tubewells and wells and other sources classified into surface and ground water sources and crops irrigated are required every year. Data are also needed on areas provided with drainage facilities, particularly in heavy rainfall areas. Land-use is an important sphere where multiple cropping, waste land reclamation and crop planning are assuming great significance. It is, thus, essential to have information on potential land use classification taking into account the natural endowments of different regions, availability of capital and other resources for development of land for its optimum use and the economic returns from alternative uses.

60.7.14 Availability of firm estimates of production of milk, eggs and meat products is essential for the realistic formulation of plans in the animal husbandry sector. Until recently these estimates were worked out on *ad hoc* basis by the Directorate of Marketing and Inspection. Recently sample survey techniques have been evolved for estimation of the output of milk and other livestock products. The Livestock Statistics Cell in the Department of Agriculture is taking action to extend the surveys in different States. Statistical information on inputs for livestock and poultry production is also extremely important for providing the basis for estimating the relationship between the volume and quality of feed and the productivity of livestock and poultry.

60.7.15 Reliable data on national income and share of agriculture therein are indispensable for agricultural planning. Data on financial outlays in the public sector and investments by the private sector in agriculture and allied fields of development are also essential. Also, statistics of institutional finance through cooperatives, commercial banks and other agencies are equally important for formulating measures for channelling them in accordance with the needs of the development programmes. Statistics of labour force in agriculture and employment, under employment and unemployment are also

needed at sufficiently disaggregated level to facilitate the planning and evaluation of employment programmes.

60.7.16 There is another dimension of statistical analysis, which has to be developed to monitor the progress of plans especially from the point of view of eliminating chances of imbalances arising in different areas of economic activity. This is needed for preparation of "material balances" at various stages of plan implementation. The process of balancing should embrace all aspects of agricultural growth, *i.e.*, supply of various goods against demand, of production against consumption, of imports against exports, of raw materials against finished goods, of investment against savings and of financial resources against physical targets. Ideally it is only within the framework of material balances that one can assess the factors which determine the demand for agricultural production. Considered alongwith the macroeconomic assessment of plan and its broad industrial balances, these material balances provide the rationale for fixing output targets of principal commodities in the plan and give evidence on the balance and consistency of the plan.

60.7.17 The Planning Commission did not publish the numerical schemes of calculations connected with plan formulation till the Fourth Five Year Plan. Input-output tables which sought to establish the balance and consistency of the plan at the aggregate level were first published in connection with the Fourth Five Year Plan and included 77 sectors. The methodology was improved further and the formulations for the Fifth Five Year Plan were based on an input-output table consisting of 66 sectors. A Technical Note on Approach to the Fifth Plan was published by the Planning Commission in April, 1973 giving the detailed methodology of these calculations. We are of the view that the detailed data used in the input-output tables and the technical co-efficients should be published on a regular basis. It is important that in a rapidly changing technological situation, such co-efficients should be brought upto date at five year intervals.

8 REGIONAL PLANNING FOR BALANCED DEVELOPMENT

Regional Disparities in Growth

60.8.1 The need for reduction in disparities and balanced development between different regions was recognised in the successive five year plans although the emphasis varied from plan to plan. The First Plan referred briefly to regional disparities while the Second Plan proposed dispersal of industries as a means of achieving regional

development. The major policy statement on balanced regional development, occurred in the Third Plan in which the emphasis was on urban metropolitan city problems and development. In the Fourth Five Year Plan, apart from urban and metropolitan development, balanced development was sought to be achieved mainly through reduction in regional disparities. It was recognised that limitation of resources was the main bottleneck in undertaking large scale programme for reducing disparities. But as more resources became available, the backward regions were also sought to be benefited through special programmes in addition to the normal plan schemes. The principle of balanced regional development received operational significance by the study of disparities in the State incomes and allocation of Central assistance under the five year plans to States with lower per capita income. The State Governments were also asked by the Planning Commission to study the levels of development of the different districts on the basis of indicators of growth and development. The essential idea was that while the Centre would provide larger financial assistance to backward States, the States in their turn should allocate resources for the removal of disparities in development at the district level and for identified backward areas. Thus, the concept of regional planning was intended to be operative through a policy and institutional framework from the national level to State and district levels. Some special assistance was also earmarked for the development of backward areas and special programmes were prepared for hill areas, tribal blocks and other such special areas.

60.8.2 In the agricultural sector, however, the growth process has been conditioned by certain overriding priorities which tended to relegate the objective of balanced regional growth to a secondary position. The major objectives of agricultural planning in the country have been achieving self-sufficiency in foodgrains and acceleration of agricultural development. The 'Intensive' approach to agricultural development adopted since the early sixties which was exemplified in area specific programmes like the IADP, IAAP and HYVP though had the logic of expediency led to aggravation of regional imbalances. As early as 1966 some economists had anticipated that the intensive approach was going to increase inter-personal and inter-regional inequalities in rural areas.

60.8.3 Attention has already been drawn to the wide inter-State differences in the compound rates of growth for agricultural production, area under crops and productivity during the period 1952-53 to 1964-65 in Section 4 of Chapter 3 on Progress of Agricultural Development. Though agricultural production at the national level

increased at the rate of 3.01 per cent per annum during the period, growth rates higher than 4 per cent were recorded in certain States like Punjab (4.56 per cent), Gujarat (4.55 per cent) and Tamil Nadu (4.17 per cent). On the other hand in certain other States, agricultural production increased at much lower rates e.g. Assam (1.17 per cent), Uttar Pradesh (1.66 per cent) and West Bengal (1.94 per cent). In Assam, Rajasthan and Kerala yields for all crops taken together were rather stagnant.

60.8.4 The continuance of the selective approach to agricultural development tended to aggravate rather than reduce the inter-State differences. A study of annual average increase in agricultural production and productivity in different States between the triennia ending 1964-65 and 1973-74 revealed that Punjab and Haryana realised annual average increases of the order of 8.35 and 6.67 per cent respectively in production largely through increases in productivity. States of Kerala, Tripura, Rajasthan, Manipur, Himachal Pradesh, Uttar Pradesh, West Bengal and Tamil Nadu achieved annual average increases in production varying between 3.1 to 5.0 per cent. Except in the case of Kerala, Tripura and West Bengal, increases in productivity largely contributed to the growth of production. In the case of Karnataka, though productivity increased at the rate of 3.95 per cent per annum, the average rate of increase in crop production was only of the order of 1.89 per cent due to shrinkage of cropped area. A somewhat similar phenomenon was also observed in the case of Gujarat and Andhra Pradesh. On the other hand a deceleration in crop production and productivity was recorded in Orissa, Nagaland and Maharashtra. The analysis revealed that the main factors, which accounted for comparatively better performance by certain States were irrigation and increased use of modern farm inputs. These clearly indicate that the regional differences were increasing over the years. We would like to emphasise in this context that the objective of agricultural development planning should not merely be maximising production in overall terms but include considerations of regional balance, economic stability and growth with justice, as we have explained in Chapter 6 on Growth with Social Justice.

60.8.5 Normally, there are differences in the levels of income of large, medium, small and marginal farmers, and of farmers in rainfed areas and areas with assured irrigation. Wide variations also exist in net income from different crops. These differences have tended to widen as a result of the selective approach adopted under the new agricultural strategy combined with the existing ins-

titutional framework for credit and marketing. The agricultural planning process should provide remedies for reducing the three types of imbalances which have emerged over the various five year plans. The imbalances between the rainfed and irrigated areas are sought to be reduced through the implementation of special programmes for dry farming and agricultural diversification. Disparities in the other two categories can be reduced through research and development programmes for augmenting the productivity of various crops and by improving the facilities for supply of inputs, extension, credit and marketing to weaker sections of the farming community. These aspects have been dealt with in Chapter 59 on Special Area Development Programmes.

Regional Approach to Planning

60.8.6 An essential pre-requisite of regional agricultural planning is the classification of the country into agro-climatic or agricultural regions. There are wide regional variations in the agricultural resources of the country depending upon the physical, climatic and other endowments of different areas. Other factors such as levels of socio-economic development, demographic and cultural patterns are also relevant in this context. While formulating plans for agricultural development it would be useful to consider homogenous regions and draw up programmes for the full development of the potentialities that exist in each area. The Commission has identified over sixty homogenous agro-climatic regions, based on data relating to rainfall and area under crops. If the detailed soil patterns along with soil classifications and soil profiles are super-imposed, the number of detailed regions requiring individual planning will increase. In the ultimate analysis regional planning may be substantially district planning and as such the detailed work of plan formulation would essentially have to be done by the district planning cells. Where a region falls across two districts or more a coordinating committee could deal with the problem on adhoc basis. The pattern of development in each of the identified regions will depend upon the resource endowment of the area, potentiality for development and the nature of constraints to be removed. These regional agricultural development plans have to be tied up with the framework of overall national planning.

60.8.7 As each backward area represented a unique combination of factors, no uniform programme of development could be successfully conceived and imposed from the national level. An essential pre-requisite for accelerated development is therefore the evolution

of appropriate location-specific strategies based on a careful identification of the causes of backwardness as well as the potential available for development. The pattern of development would thus differ from region to region. In Rajasthan, for example, some areas are suitable for crop production particularly where irrigation water is available, but over large areas livestock development would be more appropriate. Similarly, in Madhya Pradesh, wherever forests are important the emphasis in regional planning will be on the full development of this resource. The areas which generally lag in development are hill and tribal areas, and arid (hot & cold desert) and semi-arid areas, prone to drought. Besides, there are pockets in Gujarat and West Bengal which require special development measures to get over salinity problems. We have studied these special problems of these backward areas and have made detailed recommendations for tackling them in Chapter 59 on Special Area Development Programmes. We would emphasise that the objective of regional planning should be the economic advancement of each region so that the areas are able to contribute individually and collectively to the achievement of national plan objectives. The aim should be to ensure that all efforts for regional development are organised in such a way that they do not impede the rate of growth of the national economy and it should be possible to do this if a perspective plan for long term development is drawn up.

60.8.8 The need for detailed planning at regional level, thus, arises mainly because of the recognition of the fact that regional imbalances occur due to differences in factor endowments. In some areas, the resources may be available, but the infrastructure is not adequate to fully utilise the potential resources. In such cases, accelerated development of infrastructure will help open up new areas and in tapping of resources. On the other hand, there may be areas where potentialities for development of crop production may be poor. In such cases, the private sector is not likely to invest as the return on investment is likely to be low. The Government has therefore, a responsibility for the development of these areas. It is in such areas that there is need for introduction of programmes designed to benefit the weaker sections of the population through the development of animal husbandry, fisheries, horticulture, social forestry, etc.

60.8.9 Infrastructure development needs : We would like to emphasise that development of infrastructure is basic to the development of various backward regions. The first task in regional agricultural planning is, therefore, the identification and removal of inade-

quacies in the matter of infrastructural development. In order to make use of the facilities thus created, development programmes have to be undertaken simultaneously. Any time lag between the creation of the infrastructure and the implementation of the development programmes is likely to make the infrastructure infructuous. Further, the programmes for infrastructural development in backward areas have also to conform to a long-term policy within the available financial resources.

60.8.10 Tailor-made plans for areas: In each backward area, choices for investment are not so obvious and have, therefore, to be identified on the basis of a careful investigation of local potentials. The investment pattern should then be integrated into the framework of appropriate strategies evolved on the basis of the existing levels of productivity, trends of development, assessment of organisational capabilities, coverage and quality of infrastructure, patterns of consumption, production relations, vocational patterns and availability of skills and entrepreneurial availabilities¹. Even the identification of such areas and the constraints that are operating in them presents considerable difficulties due to the paucity of data and conceptual and methodological inadequacies. These deficiencies need to be overcome. Appropriate techniques for regional planning should be developed and steps taken to minimise the possible conflict between the criteria of efficiency and equity.

60.8.11 Perspective plans for agro climatic regions: The growth possibilities in the various regions within a State and the need for change of strategy to get the maximum out of any region can best be analysed and formulated at the State level. It has been observed that the present cropping pattern in a region or the type of animal husbandry that is followed in the region may not necessarily be the best for the agro-climatic potential of the region. The cropping pattern, at present prevalent, may be a matter of tradition. Animal husbandry development may not have been examined at all as has been the case in many regions with tremendous potential for this development. Planned development of animal husbandry as a commercial venture and marketing of milk and milk products as organised in certain areas of Gujarat have indicated what such developments can do. Analysis of the situation from this angle can best be done at the State level. States will have to take note of the various developments that have taken place in the country on pilot scale since the Second World War to understand the possible potential

¹Planning Commission, Draft Fifth Five Year Plan, 1974—79, Vol. II, January 1974, p. 282, New Delhi.

of their regions. Information on developments in other parts of the country with similar agro-climatic conditions can be obtained through the Central planning division, but the detailed planning and programming for the regions in the State will have to be done at the State level. We recommend that the Planning Cell under the Agricultural Production Commissioner in the State should undertake the detailed perspective planning for the various agro-climatic regions in the State. In this task, it will have to take the help of the agricultural universities and other scientific organisations and technical departments which can assist in formulating a detailed plan.

60.8.12 The State, having drawn up a Perspective Plan for the development of regional resources, the latter will have to be referred to the district planning Cells for consideration whether the changes postulated can be carried out under the socio-economic conditions prevailing in the country and within the existing infrastructure and in what period of time. The district planning Cell can refer to the Central Planning Division through the State Planning Cell the problems that may have to be faced in detailed planning for development of infrastructure or removal of socio-economic constraints. The district planning cells should then keep note of the immediate constraints and plan the programmes to be carried out in the district in the light of the advice received from the Central and State planning units.

60.8.13 The State Agricultural Planning Cell should try to build into the State plan the necessary correctives to existing infrastructure and socio-economic constraints on the basis of the feed back by district cells within a specified time. The problems that cannot be resolved at the State level will have to be passed on to the Planning Division in the Ministry of Agriculture and Irrigation for examination in the perspective of the national plan and indication of the possible time schedule for various components of infrastructure development and socio-economic changes. It needs to be realised that this process of perspective planning and continuous evaluation, dialogue and adjustment are necessary for achieving quicker progress, in the regions within a reasonable time limit.

Infrastructure Planning

60.8.14 We should like to emphasise that along side with the need for macro planning for development of agricultural resources in various agro-climatic regions, there is an equally pressing need for infrastructural planning for maximisation of production and pro-

ductivity. Such macro planning can be done only at the national level. Macro planning and policy guidance become necessary for irrigation, communications, marketing and socio-economic changes. As explained in Chapter 15 on Irrigation, water use in various regions of the country is not equally productivity oriented. Irrigation patterns can certainly be adjusted to suit the requirements of crops and crops and varieties changed to suit the rainfall patterns. The relative cost factors that can be accepted for productivity and production development in areas of scarce rainfall can be decided only at the national and State levels. A consensus for planning water use can also be developed and operated only at the Central and State levels. Similarly for increasing productivity, communications have to be developed in areas where economic development is hindered due to lack of such facilities. In the Interim Report on Production Forestry-Man-Made Forests we had pointed out how in large areas of this country forests are deteriorating for lack of planned exploitation. This is mainly due to inadequate communications and facilities for exploitation and regeneration. It has been pointed out that future investments should be fully commercial. The opening up of these areas for increasing productivity requires national planning in development of road and rail communications. There are areas like the north-eastern parts of the country and Himalayan hill ranges, where horticulture, animal husbandry and forestry can be developed. Communications and marketing are the two major problems in these areas. Both these can be solved only by national planning. Exploitation of seas for marine products has to be nationally planned for maximum productivity. We recommend that these problems of a macro dimension for increasing regional productivity and production to conform with our objective of growth with social justice should be taken up in hand at the national and State levels. The Planning, Evaluation and Coordination Division in the Ministry of Agriculture should take the lead in this matter.

Socio-political Factors in Regional Development

60.8.15 It has generally been the experience that the present level of production in an area does not truly reflect its potential. Areas similarly endowed by nature may not show similar trends in production or the same order of growth because of varying levels of exploitation of their resources. An important contributory factor for the inability to exploit resource potential in many areas has been the weakness of the existing socio-political

structure. A change over from a rigid, hierarchical and tradition-bound system to a more flexible and modern one, which meets the requirement of a welfare State has not been equally rapid in all areas of the country. It has been particularly slow in backward regions. Only at the national level can policies and directions be evolved to bring these areas within the modern socio-political structure, built up on concepts of social equality and distributive equity, which facilitates rapid exploitation of resources for the benefit of the community.

60.8.16 The detailed work on regional plans would involve intensive training in the analysis of available data, identification of the constraints on development, formulation of suitable solutions to overcome these constraints and finally implementation of programmes for development. These call for inter-disciplinary coordination among the scientists and planners in the relevant fields. This work should also be undertaken under the auspices of the planning units at different levels already referred to.

9 LESSONS OF PLANNING

60.9.1 Considering the vital role which agriculture plays in economic development of the country it has always been accorded a pride of place in Indian planning. However, in the process of formulation and implementation of agricultural plans, some major shortcomings have become obvious. Target setting on the basis of yardstick approach has been the weakest link in the sphere of formulation of agricultural plans. It also happens that the targets are not specified in sufficient details at functional levels, which results in delay at the implementation stage. Further, there is no systematic appraisal of progress which is essential for securing successful implementation of the plan.

Yardstick Approach

60.9.2 It is essential to constantly review and improve upon the methodology for projections of demand over a perspective period. The yardsticks which are used for estimating the production feasibility should be fixed separately for relatively homogenous groups of farms or at least for relatively homogenous agro-climatic regions. They should be reviewed at the end of each plan period to take account of the technological changes that have occurred during the plan period. Special surveys during the course of implementation of the plan would

be very useful for checking the yardsticks used at the formulation stage. Information gathered through such surveys would provide useful correction factors for the yardsticks in use.

Progress Reporting

60.9.3 The quality and coverage of reporting progress of individual schemes on the part of most of States have suffered since the middle of the Third Plan when scheme wise patterns of Central assistance were discontinued. At the time of formulation of annual plans, though it is claimed that progress of individual schemes or group of schemes is reviewed, in actual practice this does not happen. The State Governments do not furnish full information in regard to the progress of even the major schemes included in the State plans. Formulation, implementation and assessment of progress of agricultural development plans is also hampered by the lack of availability of reliable and comprehensive data on the various aspects of development. These are some of the major problems requiring urgent attention. -

Planning Methods and Procedures

60.9.4 The efficiency of planning depends to a large extent on planning methods and procedures. It is necessary to streamline the procedure for finalisation and sanction of different kinds of plan schemes with a view to making them less time consuming. Care should also be taken to ensure that the plan, once formulated is also reflected in the budget proposals of the States/Centre. There should be a close integration of the plan and non-plan outlays for the agricultural sector and the formulation of the agricultural plan should be based on proper assessment of total resources likely to be available from all sources. In the field of agricultural finance the role of non-government agencies, both institutional and private, should be encouraged. The instrument of subsidies should be relied upon sparingly in the case of few important schemes concerning small farmers, backward areas etc.

Restructuring Planning Machinery

60.9.5 The problems of plan formulation and implementation arise out of weaknesses at different levels of planning machinery. Compartmentalisation of functions occurs within the agricultural sector arising out of the multiplicity of departments charged with

ostensibly different but apparently similar responsibilities. This Commission has analysed in some detail the development and functioning of various planning organisations in the agricultural sector over the planning era. This analysis reveals that there have been two major constraints acting both on the work relating to formulation of plan programmes and their implementation, namely: (a) a large number of agencies were involved both at the Central and State levels which resulted in overlapping of functions and lack of coordination; and (b) there was hardly any established machinery available for agricultural planning below the State level.

60.9.6 Several recommendations have been made in this chapter for plugging these shortcomings. It is important that the Centre and States should work as parts of a single system in which the right relationship between the two should be guided by tests of efficiency and economic viability and ensured through understanding and adjustments. For effecting proper coordination between various agencies responsible for different aspects of agricultural planning, steps are already contemplated under the Fifth Five Year Plan to restructure the planning machinery, at different levels. The draft Fifth Plan proposals also envisage strengthening and reorganisation of Planning Departments at the State level and establishment of special units for monitoring plan information, evaluation and project appraisal. We support these proposals.

60.9.7 As indicated earlier the concept of regional planning for balanced development was adopted from the Third Five Year Plan onwards. Comprehensive regional planning with special emphasis on agricultural planning will have to be organised in a more systematic and coordinated manner. The experience of regional planning so far indicates the weakness of the organisational set up, particularly the economic and statistical wing manned by trained personnel. Formulation of regional/agricultural plans would require collection of basic and interrelated data and selected data based on surveys and investigations.

District Level Organisation

60.9.8 In addition to these proposals, the Commission has presented in Chapter 62 on Administration an outline of the administrative structure at the State and lower levels which needs to be developed for effective agricultural planning and development. We would like to emphasise particularly the need for strong organisation at the district level. The district is the crucial operational unit in agricultural planning responsible for translating policy directives

from the State or the Central level into suitable action programmes, organising and directing field staff, fixing detailed targets and standards of performance, evaluating progress of various development programmes and providing the feed-back to the State planning organisation. The district planning organisation is also necessary to translate into practicable development programmes the regional/area approach to development in respect of those aspects of agriculture which have necessarily to be planned in terms of homogenous agro-climatic regions. To the extent possible, the planning process for agriculture needs to be decentralised. It would then be possible to take into account precisely, the requirements of individual areas, the special problems and their solutions. For example, the needs for groundwater and its exploitation can more appropriately be taken into account at the village level. Only a strong district planning organisation will be able to help in formulation of village plans, integrate them with the regional/area plans for irrigation, soil conservation etc. and ultimately bring them together into the framework of the State plan.

10 SUMMARY OF RECOMMENDATIONS

60.10.1 The main recommendations are given below:

1. Plan formulation process has to commence from below, making optimum use of resources available locally, for the development programmes to be realistic and feasible.

(Paragraph 60.3.1)

2. At the district level, there should be an effective set up, both for drawing up integrated plans and budget for agricultural development and coordinating the implementation of various agricultural programmes at the field level.

(Paragraph 60.3.4)

3. Planning efforts at water-shed and regional levels, in regard to both formulation and implementation should be effectively coordinated and integrated with such efforts at the district and the State levels.

(Paragraph 60.3.4)

4. The concept of whole-village development needs to be tried seriously on a pilot basis. This concept requires a strong and devoted leader who can counter initial reactions of the vested interest to the programme of social justice inherent in it.

(Paragraph 60.3.6)

5. Alternatively, a plan based on an area approach taking a village and developing to a large water-shed should be tried. Farmers' participation in such a plan has to be mobilised by the agricultural extension organisation with necessary help from other field organisations. The farmers' service society recommended by the Commission can deal with both credit problem on an area basis and provide responsible extension organisation under the control of the Society.

(Paragraph 60.3.7)

6. A district should ordinarily be the unit of planning for agricultural production except for irrigated agriculture where the unit would be the command area. Where the planning unit extends over more than one district, there should be close coordination between the district units concerned.

(Paragraphs 60.3.9 and 60.3.10)

7. It is necessary to assess the total financial resources likely to be available for agricultural development in the form of plan allocations and committed non-plan funds and those from institutional resources. Programmes for agricultural development should be drawn up on the basis of such an assessment.

(Paragraph 60.4.10)

8. There should be a closer coordination and understanding on methodology, approach and basic assumptions for formulation of plan proposals among the various working groups at the Centre and in the States. There should also be a greater involvement of representatives having field experience from States as well as non-officials (e.g. agricultural economists, scientists and progressive farmers) in these working groups.

(Paragraph 60.4.11)

9. The procedure for formulation and administrative approval of Centrally sponsored schemes needs to be simplified. Larger discretionary powers should be given to the Ministry of Agriculture and Irrigation in issuing administrative approval and expenditure sanctions to approved Centrally sponsored schemes. The State Governments should also be given freedom to adjust the details within the broad objectives of the model schemes.

(Paragraph 60.4.12)

10. Plan schemes should be drawn up in sufficient detail so that they could be taken up as soon as the plan is approved for implementation by concerned authorities.

(Paragraph 60.5.2)

11. Greater decentralisation of powers and delegation of authority are necessary for effective implementation of plan projects. A careful

review has to be made of the current procedures and as far as possible the power of decision-making should be decentralised.

(Paragraph 60.5.3)

12. An effective evaluation system is essential to keep a watch on the progress of schemes and for keeping the implementation agency adequately and promptly informed about their progress. Apart from proper evaluation and appraisal of projects by Government departments, evaluation through independent autonomous bodies like the agricultural universities and research institutions should be encouraged.

(Paragraph 60.5.6)

13. Suitable information and reporting systems need to be evolved so that those responsible for implementation can anticipate difficulties, judge the progress and performance of these programmes in relation to pre-determined targets with a view to take necessary corrective measures.

(Paragraph 60.5.8)

14. A strong and well organised Planning Division should be set up in the Ministry of Agriculture and Irrigation combining the functions of planning, administrative coordination and concurrent evaluation.

(Paragraph 60.6.5)

15. The present system of periodic reviews at the Centre in respect of Central and Centrally sponsored schemes should be supplemented by integrated sectoral reviews as well as reviews of the total agricultural sector with the support of the proposed evaluation units.

(Paragraph 60.6.11)

16. There is need for setting up planning units at district level and corresponding units at the block level which should be responsible for formulating agricultural plans and keeping a watch over their progress. The functions of these units are given in paragraph 60.6.17.

(Paragraphs 60.6.17 and 60.6.18)

17. The methodology for formulating projections of demand should be constantly reviewed and improved upon. Apart from economic considerations other considerations such as attaining desirable and feasible nutritional levels of diet, changes in tastes and preferences, etc. have also to be taken into account in making demand projections.

(Paragraph 60.7.2)

18. A careful assessment of the production potential has to be made in respect of different agro-climatic regions. The conditions in different regions have to be carefully analysed for improvement of biological productivity. Even within the same agro-climatic region

there are differences in productivity which require a careful appraisal for a complete restructuring of cropping patterns on agro-climatic considerations.

(Paragraph 60.7.4)

19. The yardstick should be fixed separately for relatively homogeneous group of farms (or at least for relatively homogeneous agro-climatic regions) and for different crops. These should be reviewed at the end of each plan period to take account of technological changes that have occurred during the period.

(Paragraph 60.7.5)

20. Specific targets of production should be indicated down to the district level which is the crucial level of plan implementation.

(Paragraph 60.7.7)

21. Targets of production in respect of essential commodities might be fixed not in terms of a single figure of final output but in terms of range of output or aggregate output during the plan period.

(Paragraph 60.7.8)

22. The concept of yardsticks and production potential should be extended to animal husbandry and fisheries sectors.

(Paragraph 60.7.9)

23. A systematic identification of areas with low productivity and factors leading to it is a necessary pre-requisite for suggesting measures for improvement of productivity.

(Paragraph 60.7.11)

24. Agricultural planning has to be a comprehensive effort starting with an assessment of the potential for production, drawing up of development programmes to tap this potential and creating the necessary infrastructure to ensure the availability of inputs, credit and marketing facilities needed by the farmers to translate these programmes into practice.

(Paragraph 60.7.12)

25. The data base for agricultural planning should be improved on the lines indicated in paragraphs 60.7.13 to 60.7.17.

(Paragraph 60.8.4)

26. The objective of agricultural development should not be merely one of maximising production in overall terms but should also include considerations of regional balance, economic stability and growth with social justice.

(Paragraph 60.8.4)

27. In the ultimate analysis detailed work of regional planning would essentially have to be done by district planning cells. Where a region covers two or more districts, a coordinating committee could

deal with the problems on an *ad hoc* basis. The regional agricultural development plans would also have to be tied up within the framework of overall national and State planning.

(Paragraph 60.8.6)

28. The evolution of appropriate location specific strategies based on careful identification of the causes of backwardness as well as the potential for development is an essential pre-requisite for accelerated development in backward areas. Appropriate techniques for regional planning should be developed to minimise the possible conflict between the criteria of efficiency and equity.

(Paragraphs 60.8.7 and 60.8.10)

29. There is need for introduction of programmes designed to benefit the weaker sections of the population through development of animal husbandry, poultry, fisheries, horticulture, forestry, etc. in areas where the potentialities for development of crop production are low due to poor resource endowment.

(Paragraph 60.8.8)

30. Identification and removal of inadequacies in the matter of infrastructural development is basic to the development to various backward regions. Such programmes have to conform to a long-term policy within the available financial resources. It is also important that in such areas other development programmes are also undertaken simultaneously with infrastructural development.

(Paragraph 60.8.9)

31. The Planning Cell under the Agricultural Production Commissioner should undertake the detailed perspective planning for the various agro-climatic regions in the State. Agricultural universities and other scientific organisations and technical departments should be fully associated with this process of formulating a detailed plan.

(Paragraph 60.8.11)

32. After a perspective plan for development of regional resources is drawn up by the State, the district planning cells have to examine how far under the socio-economic conditions prevailing in the district and in the existing state of infrastructure, the changes postulated can be carried out and in what time frame. District planning cells can also refer to the Planning Division in the Ministry, through State Planning Cell, the problems that may have to be faced in detailed planning for lack of infrastructure or socio-economic restraints.

(Paragraph 60.8.12)

33. The Agricultural Planning Cell at the State level should build into the State plan the necessary correctives on the basis of the feedback by the district cells about existing infrastructure and socio-

economic constraints. The problems that cannot be resolved at the State level will have to be passed on to the Planning Division in the Ministry of Agriculture and Irrigation to be examined in the perspective of the national plan.

(Paragraph 60.8.13)

34. Planning of certain aspects like irrigation, communications, marketing and socio-economic changes have to be done at the macro (national) level. Water-use planning and the developing of a suitable infrastructure therefor has to be done at the State and national levels. Increasing the productivity of backward areas like north-eastern part of the country and Himalayan hill ranges, requires national planning of communications, both roads and rail. Exploitation of seas for marine products has to be nationally planned for maximum productivity.

(Paragraph 60.8.14)

35. Detailed work of regional planning would involve intensive training in the analysis of available data, identification of constraints on development, etc. and would also call for inter-disciplinary coordination between the scientists and planners in the relevant fields. This work could be undertaken under the auspices of the planning units at different levels.

(Paragraph 60.8.16)

36. The procedures for finalisation and sanctioning of different types of plan schemes should be streamlined to make them less time consuming.

(Paragraph 60.9.4)

37. Formulation of regional/agricultural plans would require collection of basic trend and interrelated data and selected data based on surveys and investigations.

(Paragraph 60.9.7)

STATISTICS

1 INTRODUCTION

61.1.1 Agricultural statistics in India have a long tradition. Artha Shastra of Kautilya (321-296 BC) makes a mention of their collection as part of the administrative system. During the Moghul period also some basic agricultural statistics were collected to meet the needs of revenue administration. In 1666, the British Government initiated collection of these statistics mainly as a byproduct of revenue administration and these reflected the then primary interest of the Government in the collection of land revenue. Subsequently, the emphasis shifted to crop forecasts designed primarily to serve the British trade interests. On a representation made by a leading firm of Liverpool, trading in wheat, the preparation of wheat forecast was taken up in 1884. By 1900, oilseeds, rice, cotton, jute, indigo and sugarcane had been added to the list of forecast crops. Improvements in the statistics collected were brought about through acceptance by the Government of the recommendations made by the Royal Commission on Agriculture (RCA), 1928 with regard to the quality and coverage of the statistics as well as for re-organising the country's statistical set-up.

61.1.2 During the Second World War, when the attention of the Government was focussed on the critical food situation, the need for timely and reliable statistics of food production was keenly felt for purposes of implementation of food policy and administration of controls. The initiation of the crop-cutting experiments based on random sample surveys for estimation of yield rates of principal crops for replacing the traditional eye-appraisal method was the direct result. In 1949, the Technical Committee on Coordination of Agricultural Statistics (TCCAS) set up by the Ministry of Agriculture highlighted the gaps in agricultural statistics and the improvements necessary to remove the defects.

61.1.3 With the ushering in of the planning era in 1951-52, greater attention was paid to the improvements in the collection of statistical data on a number of items and schemes for improvement

of agricultural statistics were implemented by the Central and State Governments as part of the successive five year plans. During the First and Second Plan periods, the Directorate of Economics and Statistics (DES), Ministry of Agriculture and Irrigation sponsored schemes for adoption of basic annual and quinquennial forms recommended by the TCCAS, extension of reporting area, estimation of production of protective foods and minor crops of commercial importance, rationalised supervision over the work of the area enumeration and preparation of index numbers relating to agricultural economy. A number of other organisations like the Institute of Agricultural Research Statistics (IARS), Central Statistical Organisation (CSO), Directorate of National Sample Survey, now re-organised as the National Sample Survey Organisation (NSSO) and the Indian Statistical Institute (ISI) also participated in the efforts directed towards the improvement of agricultural statistics in different ways. A standing Committee on Improvement of Agricultural Statistics (CIAS) was set up in the Ministry of Agriculture in 1961 to guide and review the implementation of the schemes for improvement of agricultural statistics. Efforts for improving the quality and content of the statistics continued during the Third and Fourth Plan periods. In December 1969, a Data Improvement Committee was set up under the chairmanship of Dr. E. S. Minhas to look into the problems of improving the data base of the economy. In regard to agricultural statistics, this Committee made some useful recommendations for improvement to meet short term policy needs. In retrospect, the decade of fifties witnessed a period of initiation of new schemes for improvement of agricultural statistics, while during the sixties, efforts were made to consolidate the improvements.

61.1.4 The current status of agricultural statistics, the methods of their collection, gaps and lacunae with regard to their adequacy, timeliness, reliability and uniformity in concepts and definitions are given in this chapter. The chapter also deals with improvements in agricultural statistics including those of livestock, fisheries and forestry. The improvements necessary in the organisation for agro-economic research in the country are discussed in Section 19.

2 LAND UTILISATION AND AREA UNDER CROPS

Non-Reporting Areas

61.2.1 Land utilisation statistics are available in India almost continuously since 1884, although their geographical coverage has been

changing from time to time and their scope has been gradually expanding. Out of the total geographical area of 328 million hectares, land-use statistics are available for roughly 306 million hectares. Thus, only for about 7 per cent of the geographical area of the country these data are not available. Of the 22 million hectares for which land use data are not available, 17.7 million hectares are located in Jammu & Kashmir and broadly cover the area under illegal occupation of Pakistan and China for which no data become available. The non-reporting area in other States largely consists of hill tracts in Arunachal Pradesh, Nagaland, Manipur and Tripura. Besides, there are small tracts in some States where due to the absence of cadastral survey and/or the village revenue agency, no regular statistics are collected. Some of those areas are also not accessible, being covered either by forests or by barren mountains. Regular cadastral survey of these areas is bound to take time. In some areas which are covered by barren hills or which are under snow all round the year, cadastral survey may not also be necessary. For completing the coverage of the land utilisation statistics, it should, however, be possible to estimate the geographical area of these non-reporting areas and their broad land use classification on the basis of aerial photographs coupled with broad topographical survey on the ground. It is understood that aerial photographs are already available with the Survey of India and what is necessary is a proper interpretation of these photographs. The Commission had taken up with the Governments of Assam, Nagaland, Manipur, Tripura and Mizoram the question of preparation of *ad-hoc* estimates of land utilisation for the non-reporting areas falling within their respective territories. It is important that the coverage of agricultural statistics should be extended to the entire geographical area by 1978-79 at the latest.

Methods of Collection of Area Statistics

61.2.2 From the standpoint of collection of area statistics, the country can be divided into three categories. In the first category are the former temporarily settled States where the village revenue agency collects the statistics as part of land records. The agency consists of village officials*—one in-charge of a village or a group of villages. The collection of primary data on the basis of field to field inspection of crops and land utilisation at periodic intervals is part of their duty. After each crop inspection, the village official is required

*The village official is called 'Patwari' in Punjab, Haryana, Jammu & Kashmir, Himachal Pradesh, Delhi, Rajasthan and Madhya Pradesh; 'Lekhpal' in U.P.; 'Karnam' in Tamil Nadu and Andhra Pradesh; 'Shanbhog' in Karnataka; 'Talathi' in Maharashtra and Gujarat; 'Karemechari' in Bihar and 'Mandal' in Assam.

to submit to his superior officer a statement showing the land utilisation statistics in each season, in standard forms prescribed for the purpose. The superior officer called 'Kanungo' or Revenue Inspector, who is in charge of a revenue circle varying in size from 30 to 100 villages, controls and supervises the work of the village officials. The second category consists of former permanently settled States of West Bengal, Orissa and Kerala where no such village revenue agencies exist. As such, the land utilisation and crop area statistics in these States are based on sample surveys. The third category consists of areas which are neither cadastrally surveyed nor possess the requisite revenue agency and occurs in parts of both the first and second categories of States. In these areas the statistics reported are in the nature of eye-estimates based on the personal knowledge of the revenue officers as in the absence of cadastral survey and village officials complete enumeration and sample surveys cannot be conducted. Thus, of the total reporting area of about 306 million hectares, estimates for 81.7 per cent of the area are based on complete-enumeration, 9.2 per cent on sample surveys and those for the remaining 9.1 per cent of the area are based on conventional methods or impressionistic estimates by Village Headmen, Chowkidars and Superior Revenue Officials.

Agency for Area Statistics

61.2.3 In the areas where all fields have been cadastrally surveyed and mapped, the geographical area of each survey number and sub-number is accurately known and thus the area under the crop for a given region can be determined accurately. If, however, the whole field is not under the same crop or if there are included patches in the fields for which only the total geographical area is known, the area under the crop is normally estimated approximately by the Patwari. Thus, as a system, the collection of data based on land records is the best provided the basic records are maintained properly. Since the basic land records are maintained by the Patwari, he is the best person to do the crop inspection. He is the most knowledgeable man in the field and, as such, the most suitable man for getting reliable information if he has the will to do it and if he can be persuaded to do an honest job or enabled to do so. Further, land records being authoritative and legal documents, data based on them have certain statutory validity also. The association of Patwari with the land records and the agricultural statistics brings to bear upon the system of collection, the authority and prestige that is associated with the revenue agency in the villages.

61.2.4 In actual practice, however, it has been found that due to a number of reasons the Patwari does not devote the time and attention that is needed to the collection of agricultural statistics, resulting in inaccuracies in recording and delays in submission of returns. Firstly, the geographical jurisdiction of each Patwari is large, particularly in north India. Secondly, his functions and responsibilities have considerably increased during the recent years. The Patwari is called upon to assist the local development agencies in various ways including the certification of loan applications with regard to the title to the land offered as a security. Further, whenever any major campaign or programme such as population census, drought and flood relief, preparation of electoral rolls, elections, etc. is launched, his services are indented for. It is these more pressing and immediate items of work which disrupt the normal schedule of duties of the Patwari with regard to the collection of agricultural statistics and timely submission of land records and other returns. Apart from this, the basic reason for the unreliability and time-lag in the collection of agricultural statistics is the indifference shown by the Patwari and his superior officers to statistical data collection in recent years.

61.2.5 As the collection of timely and reliable agricultural statistics is basic to agricultural planning, we have given considerable thought to the question of improvements in the existing situation. The three possible ways to remedy the situation are: (a) to replace the Patwari by an alternative agency for the primary collection of statistics, (b) to see that the patwari agency works better under proper supervision with appropriate training and adequate guidance, and (c) to discard complete enumeration and have the basic data through random sample surveys. In our view, the creation of an independent primary reporting agency responsible for collection of agricultural statistics working under the Agriculture Department in coordination with the Revenue Department, need not necessarily bring about the desired improvement in agricultural statistics. Firstly, the number of such primary reporters needed will be so large as to be prohibitively expensive. Secondly, these primary workers too need the assistance of the Patwari with regard to the village map and the identification of survey numbers and even if the additional expenditure is incurred, it is doubtful whether this agency will have the authority and the prestige of the Patwari to deal with agricultural statistics at the base level.

61.2.6 We have considered the alternative method of having independent sample surveys for providing the various agricultural statistics replacing the complete enumeration, but we do not favour

this firstly because the sample survey cannot give estimates at lower geographical levels unless the number of samples chosen is very large; secondly such surveys will not give reliable estimates of the area under minor crops. For agricultural planning, particularly planning from below as recommended in Chapter 60 on Planning, detailed statistics at the block/taluk level and above are needed. As such, the method of sample surveys cannot be recommended as a substitute for complete-enumeration. Sample surveys, however have an important role to play, namely, in providing a check on the reliability of complete enumeration and also to give supplementary information needed for agricultural planning.

61.2.7 Thus, the only way of improving the basic structure for agricultural statistics is to enable the Patwari to do his job better and also to ensure that the Patwari and the revenue inspectors at higher level devote adequate attention to the collection of agricultural statistics and give top priority to the work especially during the periods of crop inspection. Firstly, the patwari agency should be enabled to work better by reducing the jurisdiction of each Patwari to manageable proportion. Secondly, intensive supervision both through normal revenue agencies and statistical staff, should be organised over the work of the Patwari. The primary and supervisory agencies should, therefore, be suitably strengthened. The measures necessary for improvement of the area statistics through the Timely Reporting Scheme are discussed later in this chapter.

61.2.8 In fact, in our view, the method of complete enumeration should be introduced in the remaining three States of West Bengal, Orissa and Kerala also in a phased manner so that each year more and more areas are covered by this reporting system. The Governments of the three States have already accepted, in principle, this proposal, and its implementation is awaiting the allocation of sufficient funds in the plans. We, therefore, strongly recommend that immediate measures should be taken to establish the reporting agencies in the States of West Bengal, Orissa and Kerala also with a view to enabling the collection of basic agricultural statistics on a complete enumeration basis.

Training of Primary and Supervisory Agencies

61.2.9 Arrangements should also be made for imparting refresher training to the Patwaris and the Kanungos in the detailed concepts and definitions, filling up of proforma, etc. for the collection of reliable and timely agricultural statistics at periodic intervals. Such a training

was conducted in the year 1954-55 under which selected Tehsildars or officers of equivalent level from all the States were trained in Delhi in three batches. The idea is that the Tehsildars, after they go back to their respective States, should train the Patwaris and Kanungos in suitable batches. We recommend that this training should be organised during the next two or three years; and repeated every ten years.

Adoption of Standard Forms

61.2.10 With a view to ensuring collection of land-use and crop area statistics according to standard classification and uniform concepts and definitions, the CIAS examined the basic and abstract land records forms and the land records manuals of different States and suggested suitable modifications for adoption by the States. Although most of the States have accepted the revised proformas with necessary modifications to suit local conditions, some of them have not yet implemented them for one reason or other. It is necessary that the States should adopt the revised forms and concepts and definitions and also ensure that these are followed by the primary agencies.

Land-Use Classification

61.2.11 Before 1950-51, the land utilisation statistics for India available under five categories, namely, (i) forests, (ii) area not available for cultivation, (iii) other uncultivated land excluding current fallows, (iv) fallow land, and (v) net area sown. This five-fold classification, though it gave a broad indication of land use in the country, was not found sufficient to meet the needs of agricultural planning. Also, due to lack of uniformity in the definitions and scope of the classification, the data collected in different States were not comparable. To remove this non-comparability, and make the data more useful a more detailed classification was adopted in 1950-51 which gave the land utilisation details under nine classes. The details of the classification, together with standard concepts and definitions adopted, are given in Appendix 61.1. While the changes in classification, concepts and definitions and extension of reporting area, have improved the usefulness of the area statistics, they have introduced an element of non-comparability in the published data over time.

61.2.12 It must be remembered that the land use data give the distribution of land according to its actual use and not its potential

use. While data on potential use are more essential for planning, these cannot be collected as a part of routine annual agricultural statistics. For indicating the potential land use, it is necessary to have special land use surveys which not only indicate the existing use but also the reasons why land is not being used for cultivation and also its suitability for other forms of exploitation, e.g., grazing, forests, pastures, etc. It is suggested that the State Governments should undertake a periodic survey of potential land utilisation in different areas. It will be found advantageous to confine these surveys to blocks of culturable areas on which preliminary information will be available through land utilisation statistics. Such data are necessary for proper land use planning.

61.2.13 In some of the States where consolidation of holdings has been done and land belonging to a single farmer has been consolidated into one or two large blocks, and where the farmer grows more than one crop in a block, difficulty of estimating the area under the individual crops has been experienced. This is because, in the new *Khasra*, after consolidation, the large block is given a single number and the area of the whole block is recorded. For facilitating recording of cropped area during crop inspection, the block should be sub-divided into suitable sub-numbers, and the area under each sub-number should be separately recorded in the *Khasra*.

3 STATISTICS OF CROP PRODUCTION

Crop Estimates

61.3.1 As already mentioned, the forecast of wheat was issued for the first time in 1884 and the forecasting system was subsequently extended to commercially important crops. In 1943-44, crop forecasts were prepared only for 10 crops. The scope of these forecasts, now called 'Estimates' was increased to 25 crops by 1951-52. At present, crop estimates are issued for 37 field crops besides the plantation crops of tea, coffee and rubber for which the relevant estimates are prepared by the respective boards. A list showing the forecast crops and the years in which regular estimates were started is given in Appendix 61.2 *Ad-hoc* estimates are also prepared in respect of a few minor crops and regular forecasts are proposed to be introduced in due course for these crops. These are: papaya, sweet potato, indigo and opium. As agriculture becomes technologically progressive, new crops are introduced from time to time. For example

soyabeen and sunflower have been introduced in recent years. It is necessary that the new crops should be included within the scope of crop estimation system as and when their cultivation becomes fairly extensive. This implies that the State Governments should take steps to include these crops in the scope of crop inspection and in the preparation of crop abstracts.

61.3.2 Usually, two or three estimates or forecasts are issued during a year in respect of each crop with the exception of cotton and tobacco for which five and four estimates respectively are issued. In respect of some minor crops such as castorseed, chillies, ginger, etc. only one forecast is issued. The first estimate giving the figures of area sown under the crop, is generally issued one month after the sowings have been completed in the major crop growing States. The objective of the first estimate is to provide intelligence as early as possible regarding the area sown and germination of the seed. The second estimate issued about two months later includes the area of late sowings and gives information regarding the condition of the crop in different parts of the country. The third and final estimate gives quantitative data on outturn harvested or expected to be harvested. The final estimate is required to be based on the crop inspection done by the Patwari; but the results of crop inspection are often not finalised in time and it is for this reason that there is delay in the issue of crop estimates.

Methods of Estimation of Crop Yields

61.3.3 The statistics of crop yield are obtained largely by the method of random sample crop-cutting surveys. These crop-cutting surveys are organised in different States by the State Bureaus of Economics and Statistics or the Departments of Agriculture or Land Records under the overall technical guidance and control of the NSSO. The field work is generally entrusted to the staff of the State Revenue/Land Records/Agriculture/Development Departments. The statistical design adopted for these surveys is one of stratified multi-stage random sampling with tehsils as strata, villages within the strata as primary sampling units, fields within each selected village as second stage units and finally plot of specified size, usually 5 m X 5 m in the selected field as the ultimate sampling unit. From each selected village, generally, two fields growing the relevant crop are selected and from each selected field one experimental plot of the prescribed size is selected and located at random for conducting the experiment. The size and shape of the experimental plots for different crops in

different States are given in Appendix 61.3. The produce from the plot is harvested and weighed and on a sub-sample of the experimental plots the produce is stored and re-weighed after drying so that appropriate allowance for drriage is made in the estimation of average yield. The allocation of experiments between different strata is generally done in proportion to the area under the crop. At present 95 per cent of the production of cereals and 66 per cent of production of pulses are based on random sample crop-cutting surveys. In the case of rice and wheat, the two major cereals, the percentage of area covered by crop-cutting is 97 and 98 per cent respectively. The percentage of area covered by crop-cutting experiments in respect of different crops in 1973-74 is given in Appendix 61.4.

61.3.4 Under the second method called the traditional method, which is still adopted in respect of some minor foodgrains and other crops, the yield per hectare is obtained either in terms of a direct estimate in quintals per hectare, or in terms of annas in a rupee (formerly) or paise in a rupee in relation to normal yield by eye appraisal. The estimates based on the traditional method are, therefore, subjective in nature.

61.3.5 As a method, crop-cutting surveys based on random sampling technique is also sound beyond doubt. In actual implementation, however, deficiencies have cropped up even with regard to the crop-cutting experiments. It was noticed that separate stratification is not done in selecting the sample according to irrigated and rainfed areas and according to high-yielding varieties and others. Analysis of data collected during the crop estimation surveys on the basis of random selection has shown that the proportion of area under irrigation and that under high-yielded varieties in the sample differ considerably from those given in irrigation statistics and those obtained from the progress reports regarding the spread of high-yielding varieties. The Revenue Departments were not in favour of recording high-yielding varieties at the time of crop inspection on the grounds, firstly, that the identification of the high-yielding varieties was difficult for the Patwari and, secondly, that their inclusion would increase the number of columns in the Crop Abstract. However, the State Governments have agreed to collect the information as part of the Timely Reporting Scheme to which reference will be made in subsequent paragraphs. We suggest that steps should be taken to review the sampling design adopted for crop-cutting surveys with a view to adopting the stratification according to irrigated and rainfed areas and according to high-yielding varieties and local varieties of crops, particularly for important crops which receive the benefit of

irrigation to a considerable extent and where high-yielding varieties have been introduced on a sufficient scale. This will go a long way in improving the accuracy of the estimate of yield per hectare and of total production.

Independent Estimates of Crop Production

61.3.6 Independent estimates of area and production of seven major cereals were being collected by the NSSO in their regular rounds on sampling basis through the agency of general purpose investigators who were responsible for collecting data on all types of socio-economic items like consumer expenditure, population, employment, family planning, etc. Due to various reasons, the NSS data could not be utilised for official purposes. The National Sample Survey, however, gave up the independent series with effect from the twenty fifth Round (1970-71). This was also the recommendation of the Technical Committee on Crop Estimates (1967) set up by the Planning Commission under the Chairmanship of Dr. S. R. Sen.

4 RELIABILITY OF ESTIMATES OF FOODGRAINS PRODUCTION

Foodgrains Production Estimates—1967-68 to 1969-70

61.4.1 From the methodological point of view for estimation of area through complete enumeration and that of yield through random sample surveys, the methods currently adopted in India are the best. Despite this fact, in actual practice, doubts have been expressed with regard to the reliability of the estimates of foodgrains production furnished by the States and published by the Government of India. This is particularly so for the years 1967-68 to 1969-70 when the Government of India did not accept the figures furnished by some States and published estimates of production which differed from those furnished by these States. We have examined this issue a little more critically, in view of its importance.

61.4.2 By convention, the estimates of crop production published by the Government of India are merely aggregates of the figures received from the States based on the system of crop estimation referred to earlier. However, for these three years, an assessment of weather and crop conditions, progress of programmes of agricultural development, pace and pattern of market arrivals and price situation showed

that the estimates of foodgrains production reported by some of the States had a substantial element of underestimation. It was felt that the prevailing system of recording of crop areas and estimation of yields did not fully provide for the developments in the field of agriculture introduced during the previous few years. In most of the States, till recently there was no provision for recording of areas under short-duration varieties of crops grown in summer season, particularly rice. Further, as already mentioned, the sample actually selected for crop-cutting surveys did not reflect adequately the proportion of irrigated areas and of areas under high-yielding varieties in the population in some States. The non-response, in terms of experiments planned but not conducted, which was in many cases far in excess of the permissible limits, also affected adversely the representative character of the samples. The DES revised the estimates reported by some of the States upwards to make them more realistic. The magnitude of upward revision in different years varied from 2.7 to 7.7 per cent, the bulk of the underestimation being accounted for by Andhra Pradesh, Bihar, Madhya Pradesh, Karnataka and Uttar Pradesh.

Production Estimates based on Consumption Requirements

61.4.3 The Commission looked for evidence to indicate whether the revisions made by the DES were justified. With this end in view, an attempt was made to frame the estimates of consumption requirements on the basis of net availability of foodgrains in 1973-74 and by proceeding backwards after taking into account the composite effects of changes in population, per-capita real incomes, levels of prices of foodgrains (deflated by the wholesale price index) in each of the years. For arriving at the estimates of production from the consumption data, statistics of net imports and changes in stocks were used. However, in the absence of complete data on the changes in stocks, only the stocks held by the Government were taken into account. The estimated gross production of foodgrains based on estimated consumption, the estimates issued by the Central Government and those reported by the States are given in Table 61.1.

TABLE 61-1

Estimates of Production of Foodgrains based on Consumption and Central and State Governments Estimates

(million tonnes)

Year	Estimated consumption*	Net imports	Changes in government stocks	Estimated net production**	Estimated gross production†	Gross Production	
						Central Govt. estimates	State Govts. estimates
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1966-67 . . .	76.95	8.66	(—)0.26	68.03	77.75	74.23	71.86
1967-68 . . .	82.98	5.67	(+)2.03	79.34	90.67	95.05	92.54
1968-69 . . .	86.59	3.82	(+)0.46	83.23	95.12	94.01	87.81
1969-70 . . .	90.72	3.55	(+)1.12	88.29	100.90	99.50	96.05
1970-71 . . .	94.97	2.01	(+)2.57	95.53	109.18	108.42	108.42
1971-72 . . .	94.84	(—)0.50	(—)4.69	90.65	103.60	105.17	105.17
1972-73 . . .	95.72	3.59	(—)0.49	91.64	104.73	97.03	97.03
1973-74 . . .	95.95	4.83	(—)0.46	90.66	103.61	103.61	103.61
Total:				785.56	777.02	762.49	

61.4.4 It will be seen that the estimated figures of gross production based on consumption are nearer the Central Government's adjusted estimates, in fact even higher in some cases, confirming the Central Government's contention that the State figures in many cases were gross under-estimates. However, even this method (Appendix 61.5) does not give an objective basis for correcting the States' estimates. Further, this method can be applied only after the crop year is over.

Need for Improvement in Methods of Collection

61.4.5 To study the question in some detail, a Study Team was set up under the chairmanship of Dr. B. Ramamurti, ex-Regional Sta-

*The method of estimation of consumption in Column 2 is given in Appendix 61.5.

**Col. (5)=Col. (2)—Col. (3) +Col. (4),

†Col. (6)=(5) multiplied by 8/7.

tistical Adviser to the United Nations and consisting of the representatives of the CSO, the ISI, DES and IARS for a deeper probe into the foodgrains production estimates for the years 1967-68 to 1969-70 and for evolving an objective approach for arriving at an agreed set of estimates.

61.4.6 After detailed examination of the methods of collection of statistics of area and yield followed by the States including the design of crop-cutting surveys and supervision of field work and also special visits to a few States, the Study Team came to the conclusion that "the estimates furnished by the State Governments cannot unquestionably be taken as correct estimates and we agree with the Ministry that they need to be critically examined." In regard to the upward revision of the estimates furnished by the State Governments which were considered unsatisfactory, the Study Team expressed its helplessness in providing any objective basis for such revision. It, therefore, opined that it was important to implement suitable measures for improvements in the design, methods of collection and scientific compilation and estimation so that, in future, better estimates were made available by the established agencies. We are in full agreement with the views of the Study Team that the State Governments' estimates of foodgrains production were unsatisfactory for the period 1967-68 to 1969-70 due mainly to the defects in the field implementation of methodology. Subsequently, it is understood that the Ministry of Agriculture and Irrigation has taken a policy decision to adopt the figures furnished by the States after due scrutiny in consultation with the States. Without going into the merits and demerits of this decision, we wish to emphasise the need for effecting improvements in the methods of collection of statistics. It is important that not only the techniques employed should be scientific but due attention should also be paid to the implementation and supervision of the techniques as adopted in the field.

5 IMPROVEMENT OF CROP STATISTICS

61.5.1 To be useful for planning and formulation and implementation of policy, the statistics of crop production should be available on time. In fact, "advance estimates" of likely production of foodgrains are required when the crop is still in the field in order to enable the formulation of food distribution, import and price policies. The final estimates of area based on the crop inspection done by the Patwaris are available with a considerable time-lag. The yield estimates based

on crop-cutting experiments are also not available on time with the result that the final estimates are released long after the crop is harvested and sometimes even consumed. On many occasions, the State Governments send to the Centre, final estimates of crops before all the reports based on crop inspection of area and all returns in respect of crop-cutting experiments are received by them. Because of this the final estimates need revision when the fuller estimates are available subsequently.

Timely Reporting Scheme

61.5.2 In order to reduce the time-lag between the sowing and harvesting of crops and the availability of estimates of area and production respectively, a Centrally sponsored scheme for Timely Reporting of Estimates of Area and Production of Principal Crops (TRS), was initiated by the Ministry of Agriculture and Irrigation in the year 1969-70. Under the scheme, the villages in each stratum (tehsil/revenue inspector circle/patwari circle) are divided into 5 independent non-overlapping sets, each comprising one-fifth of the total number of villages. In the case of States where area statistics are collected by complete-enumeration, one set of randomly selected villages is chosen for crop inspection on priority basis immediately after the sowings in each season are completed, but in advance of the period prescribed in the land records manuals for such crop inspection. Thus, the Patwaris in-charge of the selected villages are required to complete the crop inspection well ahead of the normal time in one-fifth of the villages. After the crop inspection in each season, the abstracts giving the total area under different crops are furnished by the Patwari through his immediate superiors and these are tabulated at the State headquarters to give the estimates of total area under the crop. There is also provision for both normal and statistical supervision of the work of the Patwaris in these selected villages. The idea is that, if each year, a different set of villages is covered under the scheme, within the course of five years, all the villages will be covered and in each village, at least in one year in five, the crop inspection is done systematically under intensive supervision.

61.5.3 In the case of States like West Bengal, Orissa and Kerala, where village revenue agencies do not exist it is proposed to introduce a miniature TRS by having field to field enumeration of crop areas in all the three crop seasons in about 10 per cent of the villages. There is also provision for supervision at different

levels. We understand that this scheme has been sanctioned and is being implemented with effect from 1975-76.

61.5.4 The TRS provides for recording the area under irrigation as well as area under high yielding varieties in the selected villages. Besides ensuring accuracy and timeliness of the enumeration of the area under crops, statistical staff under the scheme is required to inspect the field work of crop-cutting experiments and ensure timely despatch of the returns. This scheme has been taken up in a phased manner in different States beginning with Uttar Pradesh and Maharashtra. It is now in operation in 13 major States. The scheme should be extended to the remaining States by 1976-77.

61.5.5 An evaluation study of the scheme has shown that there has been a noticeable improvement in the timeliness and reliability of the estimates in some States. However, the checks carried out by the staff of the NSSO have shown some defects in the implementation of the TRS. These require close attention. There is a tendency to treat schemes such as TRS as a routine after a few years and the attention which is paid to the supervision in the beginning is not sustained. It is important that there should be a unit in the DES to exercise constant supervision to ensure the quality of the field and supervisory work done in the States under the TRS. The services of the Regional Staff of the DES referred to later should also be utilized for supervising the scheme.

Scheme for Improvement of Crop Statistics

61.5.6 While the impementation of the TRS in the States will improve the timelines and reliability of the statistics of area and production, it is necessary to introduce an element of joint Central and State supervsion on the field work done in the States with regard to the collection of agricultural statistics. The advantage of such a system is that the Ministry of Agriculture and Irrigation, which is responsible for the formulation of food policy at the all-India level, has at its disposal timely estimates of area and production. Further, the joint inspection will also bring to light the defects in the system from time to time. In fact, the NSSO, which is responsible for the technical supervision and guidance of the crop-cutting experiments, was also doing pre-harvest and harvest stage inspection of crop-cutting experiments. The sample selected for such supervision was, however, not large enough for giving any independent estimate of average yield with a reasonable degree of precision at the all-India level.

61.5.7 A scheme for Improvement of Crop Statistics has been

drawn up by the NSSO and the Ministry of Agriculture and Irrigation in consultation with us. This scheme provides for a sample check of area enumeration and crop-cutting experiments in about 5,000 sample villages by the NSSO and in an equal number of villages by the whole-time State supervisory staff covering 17 States, excluding some of the north-eastern States and Union Territories. From the villages selected for TRS or mini-TRS, as the case may be, a sub-sample is chosen randomly for conducting crop-cutting experiments. Two sets of 5,000 villages each are selected at random, one for supervision by the staff of the State agricultural statistics authorities and the other for supervision by the NSSO staff. Under the TRS, the Patwari is expected to do the crop enumeration in these villages within the first 10 to 12 days of crop inspection period. Shortly after the expiry of this period, the supervisory staff of each agency undertakes a physical check of crop area enumeration in 20 survey numbers in each sample village and compares it with the entries by the Patwari in the Khasra register. In addition, the page totals and totals of area under different land use classes and crops in the village Khasra are also checked. The supervisory staff of each agency also exercises sample check of crop-cutting experiments in selected villages. Out of the total number of crop-cutting experiments planned in the villages selected for supervision, a certain number specified for each crop are supervised at the harvest stage. The supervision of the remaining crop-cutting experiments in the selected villages is carried out at the pre-harvest or post-harvest stage as feasible. About 30,000 crop-cutting experiments are inspected at harvest stage spread over foodgrains and commercial crops. There is exchange of results between the Central and State agencies and each agency is required to undertake analysis of the sample checks of enumeration of the crop area and crop-cutting experiments in respect of both sets of supervised villages.

61.5.8 Thus, the NSSO organises a quality check on the State estimates by comparing the estimates of area and yield based on Central and State supervised samples and again by comparing these figures with those of the TRS and the estimates based on complete enumeration of 100 per cent villages and analysis of results of all crop-cutting experiments. Where there are large differences between these figures, the scheme provides a basis for examining them and also for suggesting measures for improvement. The nature of differences between the Central and the State supervision results and between the supervised and non-supervised data are examined every year by the NSSO and included in the Report on the Status of Agricultural Production Estimates prepared by the Agricultural Statistics

Wing of the NSSO. Technical advice is offered to the States for effecting lasting improvements in the crop estimation system on the basis of these results.

61.5.9 One advantage of this new scheme is that for preparing advance estimates of area and production of principal crops for various purposes, the Ministry of Agriculture and Irrigation can make use of the estimates of area and yield based on the Central and State supervised sample results and the estimates of area received under the TRS wherever these are available earlier. The final estimates of production will be based on the data furnished by the States on the basis of complete enumeration of all the villages or sample surveys in West Bengal, Orissa and Kerala and analysis of results of all crop-cutting experiments. However, in cases where there are wide differences between the figures of area based on supervised sample and complete enumeration, the nature of the differences will have to be examined with a view to evolving objective procedures for making selective use of the supervised data. In the case of estimates of yield per hectare when the results of Central and State supervision are in broad agreement but the pooled results of supervision differ widely from the results of un-supervised experiments at district and State levels, the final estimates of the concerned crop for the concerned district/State can be based on the supervised data in consultation with the State authorities. The Scheme has been implemented on a limited scale from the rabi season of 1973-74 by organising the programme on wheat in 9 important rabi States and is being implemented with effect from 1974-75 in 17 States. The survey will cover about 5,000 villages in 1975-76 and about 15,000 experiments will be supervised. A technical Working Group is examining the results of sample check thrown up by the 1973-74 survey with a view to determine the modifications necessary in the design of the sample, sample size and the estimation procedures in order to enable the building up of reliable estimates at the State level.

Recording of the Area under Mixed crops

61.5.10 There are a few other matters regarding the improvement of statistics of crop areas which need some attention. There is the practice in several parts of the country to grow mixtures of two or more crops in the same field as an insurance against the vagaries of weather. Mixed cropping is also followed for extraction as well as restoration of soil fertility at different depths. Mixed cropping enables optimum utilisation of space. Keeping in view the difficulties in the recording of area under each of the constituents of mixed crops, con-

siderable attention was devoted in the fifties to the methods to be adopted for the purpose. Land records manuals in the different States prescribe various procedures for the recording of area under mixed crops which vary from State to State. The CIAS prescribed a standard procedure and recommended it for adoption by all the States. In cases where the crops in the mixture are grown in rows and the total area under the mixture can be divided among each crop in the ratio of the number of rows under each the problem becomes relatively simple. In other cases, where the mixed crops are broadcast, the gross area under the mixture can be apportioned at the source itself on the basis of eye appraisal. In some States the gross area is recorded separately for each mixture at the field level and the apportionment is made at the district level according to set formulae. The Committee recommended that these proportions at the district level should be reviewed on the basis of data collected through crop-cutting experiments and revised where necessary. These proposals need to be implemented in all the States.

Recording of Area under Summer Crops

61.5.11 With the introduction of short-duration and photo-insensitive varieties, the sowing and harvesting seasons have undergone a change in many areas particularly under irrigated conditions. Normally, two to three crop inspections are done in a year in the different States. In some States there is no provision for inspection during the summer season. Thus, the late sown summer crops are not recorded. It is necessary for each State to review, at the district level, the sowing and harvesting seasons of different crops in consultation with the District Agricultural Officers and revise the periods of crop inspection where necessary in the light of such a review. This should be done under the auspices of the TRS. Reference in this connection is invited to our observations in paragraph 21.2.3 in Chapter 21 on Food-grain Crops regarding the revision of the reporting system for area under rice on the basis of two-monthly sowing periods due to the defects in the present classification of rice into autumn, winter and summer and the introduction of many new varieties whose growth behaviours are different from the traditional ones.

Reconciliation of Different sets of Estimates

61.5.12 There is also another problem with regard to the estimates of production of crops to which we would like to draw attention.

This is in regard to crops like cotton, where trade interests put out periodical estimates which differ considerably from official estimates. Post mortem examination of the cotton crop based on its utilization for different purposes and on the data on pressing and ginning returns shows that the trade estimates are nearer the actual crop and that the official figures are under-estimated. Past efforts at the reconciliation of the two sets of data have not succeeded in narrowing the difference. With the implementation of the new scheme for Improvement of Crop Statistics taken up by the NSSO, it should be possible to resolve this problem, very soon. Similarly, in the case of tobacco, the figures of production based on the data collected by excise authorities differ considerably from the official estimates issued by the DES. Steps are necessary to reconcile the two sets of figures. Similar discrepancies exist in the case of pepper, cashewnut etc. which also need early reconciliation. Attention has been drawn to this problem under the section relating to Fruits and Vegetables Statistics.

Advance Estimates of Crop Production

61.5.13 We have already referred to the need for having advance estimates of area and production for food policy and administration. It is often necessary to keep a continuous watch on the areas sown to crops and the likely output. At present, information regarding season and crop conditions is obtained through weekly reports received from the State Governments. The possibility of getting reports on crop conditions from selected non-officials in the rural areas on a voluntary basis was tried several years back but the proposal had to be given up due to inadequate response from the non-officials. It would be desirable for the DES to get such reports on weather and crop conditions from each Block Agricultural Development Officer and the Chief Agricultural Development Officer at the district level* and on this basis prepare qualitative reports, to start with, which could be later developed into advance estimates of crop production in quantitative terms.

61.5.14 The possibility of developing advance estimates of crop production on the basis of biometric measurements of the crop during its growth is being studied by IARS through pilot investigations in respect of paddy, wheat, jute and cotton. The scope of these investigations should be extended to other crops; and the results utilized on a field scale as soon as the requisite techniques are evolved.

*The functions of Block Agricultural Development Officer and the Chief Agricultural Development Officer are explained in Chapter 62 on Administration.

61.5.15 The pre-final estimates of crop production now issued by the DES also need improvement. The CIAS had suggested several improvements with regard to these and other aspects of improvement of statistics of area and production; we suggest that these recommendations should be pursued with the States. The CIAS should be activated and should meet more frequently, not only to consider the new proposals for improvement of agricultural statistics, but also to review action taken on its recommendations from time to time. The scope of the Committee should be widened to cover livestock, fisheries and forestry statistics as well.

61.5.16 Statistics of rainfall and other climatic factors are useful in statistics of crop production in several ways. These have been discussed in Chapter 13 on Climate and Agriculture.

Remote Sensing Techniques

61.5.17 New scientific techniques of remote sensing through artificial satellites are being tried in several countries for various purposes such as resource surveys, pest surveillance, advance warnings on impending crop failure and even crop estimation. In India remote sensing through aerial photography is being tried in Anantapur District on an experimental basis by the ICAR in collaboration with the Indian Space Research Organisation. Remote sensing refers to air-borne techniques designed to enable the gathering of information about relatively distant objects on or near earth's surface. It includes aerial photography, radar, thermal scanning, side-looking radar and remote sensing by satellite. The most promising of the new development is remote sensing by satellite under the Earth Resources Technological Satellite Programme (ERTS) of the United States. ERTS I orbits the earth at a height of 914 kms and its imagery is obtained by a mechanical scanner mounted in the satellite itself, signals being transmitted to observation stations. The satellite passes over the same ground area every 18 days and because of this an area can be monitored for changes over a period of time. Efficient use of remote sensing would include the services of satellite sensing, aerial photography and ground level observations which are in fact complementary. Results from ERTS indicate that satellite information can be applied to provide operational forecasts of crop areas. The measurement of crop growth is more difficult. Further research and tests are needed before satellite data can be operationally tried. For example, analysis of the information provided by the remote sensing techniques can indicate for broad regions, the

area under floods or the area over which sowings of crops have been delayed because of late onset of monsoon. While experiments conducted so far have indicated that the technique can be employed for distinguishing between different crops grown on small fields, adequate experience is not yet available whether it can be adopted for estimating the area under each crop in a crop mixture or whether it could distinguish between crops like wheat and barley. Even if this is technically feasible, a question arises as to the cost of such operations. It is doubtful whether there will be any significant cost advantage in adopting these techniques over the existing systems of crop enumeration adopted in India. The technique will no doubt be useful or perhaps the only one feasible in determining the land use of inaccessible areas. While we recognise the potentialities of the new techniques in pest surveillance, resource surveys, land use classification in inaccessible areas and in providing an early warning of impending crop failure on a broad regional basis, their use in crop estimation in replacement of the existing methods seems to be limited under Indian conditions. The DES should, however, keep in touch with developments in the field.

Situation and Outlook Reports

61.5.18 There is also need for preparing Situation and Outlook Reports in respect of principal crops not only for assisting the Government in its policy work, but such reports will be useful for the farmers, traders and manufacturers also. The information collected as part of the advance estimates can be utilized for preparing these situation and outlook reports. Further information regarding farmers' intentions regarding cropping, use of fertilizers etc. can be collected through the All-India Comprehensive Cost of Cultivation Scheme, by prescribing separate returns for the purpose. The Situation and Outlook Reports may cover, apart from the area under crops, other aspects such as production, prices, market arrivals, trade, internal as well external and stocks. We feel that if properly prepared and issued in time such reports will be very useful for the Government as well as the public.

6 FRUITS AND VEGETABLES STATISTICS

61.6.1 Statistics of area under different fruits are now available at the all-India level from 1958 onwards for mangoes, citrus, banana,

grapes, pome and other fruits among fresh fruit crops and cashew-nut among dry fruits. In addition, estimates of area under papaya and banana and their production based on eye estimates are also published by the DES. Even though estimates of area under some of the fruit crops are available, reliable estimates of their production are lacking. The available data on production are mostly based on ad hoc surveys carried out by the IARS and the marketing surveys carried out by the Directorate of Marketing and Inspection (DMI). In the case of banana, crop-cutting surveys for estimation of yield and production are in vogue in the important growing areas of Maharashtra, Madhya Pradesh and Karnataka. The available data on area and production of fruits are published with a considerable time lag and in some cases the data do not cover all the principal States growing the crops.

61.6.2 So far as vegetables are concerned, separate figures of area are available for potato, tapioca, sweet potato, onion and all other fresh vegetables taken together. Estimates of production are available only for potato, sweet potato and tapioca. In the case of some States, yields of a few crops like tapioca, and potato are based on crop-cutting experiments conducted every year.

61.6.3 The problems involved in estimation of area under fruits were first considered by the TCCAS in 1949 which observed that "It is not possible to include area under scattered trees in the estimates of cropped area given in Agricultural Statistics in India, as the land on which such trees stand is also covered by one or the other land use classification". Realising the difficulties in the collection of data relating to area and yield of different fruit crops, the IARS conducted a series of pilot investigations in typical districts of selected States with a view to evolving suitable sampling methodology for estimating the extent of cultivation, yield rates and production of fruit crops as well as to collect reliable data on the cultivation practices adopted. As a result of these investigations, the IARS evolved the requisite methodology but it is not being adopted in many States as high priority has not been given to the collection of these statistics so very necessary for planning in horticulture. As a result adequate financial resources were not provided under the Plans.

Recording of Area under Fruits and Vegetables

61.6.4 We have carefully considered the problems of collection of statistics of area and production of fruits and vegetables and feel that the agricultural statistics authority in each State should, in con-

sulation with the Director of Agriculture or Director of Horticulture, prepare a list of important fruits and vegetables grown in the State. Arrangements should be made for collection of information regarding the area under each of the important crops in the normal agricultural statistics on the basis of complete enumeration done by the Patwaris. While recording the area under different fruit crops only the area under regular orchards should be accounted for. In the case of orchards having two or more types of fruit trees grown mixed in such a way that each single fruit crop occupies roughly more than 10 per cent of the area of the orchard, the area under the different crops should be roughly allocated in proportion to the number of trees and distance between the trees of the respective crops. In the orchards of bearing age growing inter or support crops, the entire area should be recorded both under the fruit crop as well as under the inter or support crop.

Census of Fruit Trees

61.6.5 In order to provide a sound basis for future planning, as well as supplying a reliable frame for conducting sample surveys for studying different aspects of fruit cultivation, a census of fruit trees which should include scattered trees also should be conducted once every five years throughout the country. The census should provide data relating to number of trees of different commercially important local fruit crops according to bearing and young categories as well as according to important varieties. The planning of the census, which should be conducted through the State agencies, as well as the compilation and analysis of data should be done by a Central agency. Uniformity of concepts and definitions should be ensured in conducting the census.

Estimation of Yield Rates

61.6.6 The methodology already evolved by the IARS for estimating the yield rates and production of fruits should be adopted by the States for undertaking sample surveys for one or two crops every year in rotation in accordance with an all-India programme. For vegetables, pilot investigations should be conducted by the States and IARS in important vegetable growing areas. While conducting the surveys for estimation of area and production of fruits and vegetables uniform concepts and definitions should be adopted. The standard concepts and definitions are given in Appendix 61.6.

Market Intelligence

61.6.7 Data on wholesale and retail prices of fruits and vegetables and their market arrivals are very important for keeping a watch over the progress of their development. We recommend that in all the important city fruit markets whole-time staff should be posted to collect and report data on prices and arrivals. Ancillary data on cold storages, stocks, marketing practices and movement of fruits and vegetables by different modes of transportation i.e. by rail and road should also be collected at regular intervals.

Methodological Investigations

61.6.8 Many of the fruit trees are perennial crops and bear fruits after a period of a few years. In estimating the cost of production, the cost of cultivation upto the bearing stage has to be worked out and allocated to the crops during the subsequent years. Further in each orchard there will be mixture of young and fruit bearing trees. This presents problems of allocation of costs between the two. We, therefore, recommend that methodological investigations should be carried out to standardise the data collection techniques for estimating cost of production of fruits.

61.6.9 In the case of cashewnuts, a wide divergence is reported between the statistics published by the DES on the basis of data furnished by the States and those maintained by the Cashewnut Development Council. The discrepancy between the two sets of figures should be reconciled. It is possible that part of the difference is due to the inclusion or exclusion of data regarding cashewnuts grown in forests. Similarly with regard to some of the fruit crops e.g. mango, the estimates given by the DMI are higher than those published by the DES. One of the possible reasons for the divergence is that while the former includes estimated area covered by the scattered trees alongside canal banks, roads etc., the latter figures relate to orchards only.

Organisational Arrangements

61.6.10 A separate Unit should be set up in the DES to coordinate the data on fruits and vegetables collected by the State Departments and to bring about improvements in the data collection techniques from time to time. Research in the improvement of methodology should be conducted by the IARS. A statistics unit should be

set up in the Institute of Horticultural Research at Hessarghata which could maintain all the relevant data for use in the work of the institute. In the States where separate Horticulture Departments have been established, statistical units should be set up in the departments for looking after the work of statistics of fruits and vegetables. In other States, this work should be entrusted to a separate unit in the agricultural statistics sections.

Statistics of Processed Fruits and Vegetables

61.6.11 Statistics of processed fruits and vegetables are also required for planning the programmes for expansion of the industry and for keeping a watch on its progress. Data on the processed fruits and vegetables should be collected as part of the Annual Survey of Industries. Information is needed regarding the item-wise capacity and actual production during different periods of the year, availability of processed fruits and vegetable products for internal consumption and exports and utilisation of raw materials.

7 IRRIGATION STATISTICS

Concepts and Definitions

61.7.1 Statistics of irrigation comprise mainly data on area irrigated by different sources and that under crops irrigated. Two types of irrigated area can be distinguished—net and gross. The net irrigated area is the area irrigated during an agricultural year (July—June) counting the area only once even if two or more crops are irrigated in different seasons on the same land. Gross irrigated area is the total irrigated area under various crops during a year, counting the area irrigated under more than one crop during the same year as many times as the number of crops grown, crops sown mixed being taken as the crop. From this it follows that area irrigated more than once is obtained by deducting net area irrigated from gross area irrigated. Moreover, irrigated area is the cropped area to which water has been applied at least once in a season irrespective of whether the irrigation is adequate, inadequate or in excess of requirement. The irrigated area does not, thus take into account the depth or the frequency of watering.

61.7.2 With regard to the concepts of irrigation, the gross command area is the total area covered by an irrigation project including

unculturable area under habitation, roads, banks, barren and wasteland etc. The culturable commanded area is the gross area commanded less the area of unculturable land included in the gross area. The irrigation potential of a project is expressed in terms of the gross area that is irrigable with the amount of water available and under the cropping pattern envisaged for the project. The utilisation is the gross area actually irrigated each year. The ratio between the actual irrigation and the potential is termed as 'utilisation ratio'.

61.7.3 For a meaningful analysis of the benefits of irrigation, certain other ratios are also important. These are crop irrigation ratio, net and gross irrigation ratio, intensity of irrigated cropping and that of irrigation. The crop irrigation ratio is the ratio of area irrigated under the crop to the total area under the same crop expressed as a percentage. The net irrigation ratio is the ratio to net area irrigated to net area sown in a year expressed as a percentage, while the gross irrigated ratio is the corresponding ratio between the gross area irrigated and gross cropped area in a year. The intensity of irrigated cropping is the ratio of gross area irrigated to net area irrigated expressed as a percentage, while intensity of irrigation is the sum total of the areas irrigated under different crops in a year expressed as a percentage of culturable command area of a project. These definitions should be adopted uniformly.

Sources of Irrigation Statistics

61.7.4 The three main sources of irrigation statistics are: (i) Land Utilisation Statistics (LUS) compiled as part of Indian Agricultural Statistics brought out by the DES and the State Season & Crop Reports (Annual), (ii) Annual Administration Reports of the State Irrigation Departments, and (iii) periodical progress reports compiled by the Planning Commission, Ministry of Agriculture and Irrigation and the State Departments concerned with irrigation schemes. Besides these main sources, data on irrigation are also available through the periodical reports prepared by the Central Water Commission on major and medium projects and various assessment and evaluation reports brought out by different organisations from time to time on the basis of sample surveys and other investigations.

Methods of Collection

61.7.5 The methods of collection of irrigation statistics are basically the same as those of other land use and crop area statistics of

which they are a part. During the crop inspection, the Patwari records the area irrigated during the crop season and the source of irrigation in the relevant columns of the *Khasra*. When West Bengal, Orissa and Kerala also adopt complete enumeration, as recommended in paragraph 61.2.8, uniformity in the methods of collection all over the country can be ensured.

Defects in Statistics

61.7.6 The main defects in the irrigation statistics are: (a) time-lag in their availability, (b) lack of uniformity in concepts and definitions of terms like 'irrigation potential' and 'irrigation intensity', (c) discrepancy between the data based on LUS and those derived from the progress reports, and (d) their inadequacy to meet the requirements of planning and evaluation of progress. We have gone into the question of concepts and definitions and have indicated our proposals in Appendix 61.7. We commend these for uniform adoption.

61.7.7 As mentioned earlier, the major defect in irrigation statistics is the wide discrepancy between those based on LUS and progress reports. For example, the gross irrigated area in the Indian Union went up from 22.6 Mha in 1950-51 to 38.6 Mha in 1971-72. On the other hand, the additional area receiving irrigation benefits during the successive Plans is as under:

	Major and medium irrigation	Minor irrigation	(Mha) Total
First Plan	1.30	3.80	5.10
Second Plan	2.20	3.60	5.80
Third Plan	2.20	5.30	7.50
1966-67 to 1968-69	1.45	4.00	5.45
1969-70	0.46	1.32	1.78
1970-71	0.45	1.57	2.02
	<hr/> 8.06	<hr/> 19.59	<hr/> 27.65

The difference between the two figures is large. An attempt at the reconciliation of these two sets of figures was made, and since 1968-69, there has been an improvement and the discrepancy has become

comparatively small. This can be seen from the fact that for the year 1968-69 while the LUS gives the gross irrigated areas of 35.4 Mha, the Planning Commission (Draft Fifth Plan) gives it as 36.0 Mha. Some of the steps taken, which have reduced this discrepancy are:

- (i) In the figures of additional area benefited by minor irrigation, old irrigated area over which irrigation had been made more certain, the area benefited by water conservation-cum-ground water recharge schemes and the area protected by drainage, flood control, etc. were included. Now these have been excluded since the beginning of the Fourth Plan.
- (ii) In some of the southern States, major irrigation projects which improved the irrigation facilities in areas which were already being irrigated through minor irrigation tanks, etc., were also included in the new area irrigated. These have also been now excluded since the beginning of the Fourth Plan.
- (iii) In the minor irrigation figures there was some over-estimation on account of the higher yardsticks for different categories of works, like wells, pumpsets, etc. adopted in the progress reports. These have now been rationalised on the basis of sample surveys.
- (iv) Some of the minor irrigation works went out of used, but this area was not deducted when compiling total cumulative irrigated area in progress reports. This is now being done although there is need to further improve the estimates of depreciation on this account.

61.7.8 Some of the other steps which still need to be taken in order to reduce the difference between the figures of irrigated area according to LUS and the progress reports are:

- (i) While in the case of the major and medium irrigation projects, cognizance is taken of the fact that there is a time-lag between the creation of irrigation potential and its utilisation, in the case of the minor irrigation schemes, hundred per cent utilisation is assumed as soon as the irrigation potential has been created. Surveys in Madhya Pradesh and some other States have indicated that this is not correct and as such utilisation figures for minor irrigation works should also be separately estimated on the basis of actual recording or sample surveys, etc. It is also known that in the present circumstances, all the

shallow tubewells and pumpsets installed for use of ground water are not being fully utilised since the number of hours run are comparatively small. Thus, although the potential for pumping out water is there, yet the utilisation is rather low. The utilisation could also be low due to lack of power or non-availability of diesel at certain times from year to year.

- (ii) Quite a large number of tubewells and wells are now being constructed within the command areas of existing major and medium irrigation works to provide either supplementary irrigation or to provide irrigation to additional cropped area within the command. The supplementary irrigation figures should not be added or included in the normal irrigated areas as these areas have already been included in the benefits of major and medium irrigation works.
- (iii) When major and medium works, replace certain areas of minor irrigation works, no deduction of areas under minor irrigation is made at present. It is suggested that this should be ascertained and correction made.
- (iv) Because of intermixing of irrigation facilities in the area, through surface water from major and medium irrigation works and ground water through private minor irrigation works, it becomes difficult to apportion the area irrigated sourcewise, sometime resulting in duplication while reporting progress. A suggestion with regard to this is indicated later.

61.7.9 In view of the above, we recommend that the reconciliation of the two sets of figures should be done at the district level where the statistics reported in the LUS could be checked up with the corresponding figures of additional irrigation benefits from the different schemes. We suggest that this should be one of the functions of the Planning Unit proposed to be set up at the district level.

Suggestions for Revised Classification

61.7.10 The sources of irrigation for which separate data on area irrigated are available are: (i) government canals, (ii) private canals, (iii) tanks, (iv) tubewells, (v) other wells, and (vi) other sources. This classification does not indicate separately irrigation from major, medium and minor sources and from surface and ground water

sources. We recommend the adoption of a more rational classification of the sources of irrigation into the following:

I. Surface Water

Public surface water flow irrigation projects

(i) tanks

(a) large

(b) small

(ii) major & medium

(iii) minor

Public surface water lift irrigation projects

(i) major and medium

(ii) minor

Private surface water irrigation works

(i) flow irrigation

(ii) lift irrigation

II. Groundwater

(i) public tubewells

(ii) private tubewells

(iii) dugwells.

Definitions of the above classes are given in Appendix 61.7.

Other Improvements in Statistics

61.7.11 For taking a forward view of the development of irrigation and also for drawing up programmes for its optimum utilisation, it is not enough to obtain data regarding area irrigated from each source. What is necessary is to have the information whether the water is available perennially throughout the year or upto February or December. As noted in paragraph 61.7.1 the irrigated area relates to area on which water from any source is applied even once irrespective of whether it is adequate or not. Perennial water supply would enable two or more crops being grown on the same land but in most of the diversion schemes, water is available upto December or February. In the absence of information regarding the period of the availability of water, meaningful programmes for multiple cropping cannot be drawn up, nor can crop rotations and cropping patterns appropriate to different agro-climatic regions be determined. It is not necessary nor desirable to burden the normal agricultural statistics system with the collection of this information on an annual basis. But it should be possible to collect these data on a project basis, as part of Annual Administration Reports of the State Departments of Irrigation to which we have drawn attention later in this section.

61.7.12 Another inadequacy in the existing irrigation statistics is that source-wise break-up of gross irrigated area is not available; so also the break-up of the total irrigated area classified according to major, medium and minor irrigation schemes is not available. On a proposal made by the Ministry of Agriculture and Irrigation, the State Governments have agreed to collect this information.

61.7.13 Although many State Governments publish some information on the number of irrigation sources, namely, wells, tubewells, tanks, etc. in their Season and Crop Reports (annual), no complete information on the number and type of irrigation sources, particularly minor sources, is available on an all-India basis. The basic data for compiling this information at the all-India level is available in the basic land records in some States. What is necessary is to undertake its compilation in other States and also to conduct special surveys to update the information once in five years. We, therefore, recommend that a census of irrigation sources should be undertaken along with the agricultural census referred to in Section 13 and information on the number of public tubewells, private tubewells, dugwells, pump-sets and other irrigation sources, be compiled and published once in five years.

61.7.14 Some States like Karnataka and Madhya Pradesh have undertaken special surveys of irrigation sources and have compiled detailed information on the number of wells and their utilisation. Other States also might consider the desirability of undertaking such special surveys periodically.

61.7.15 At the all-India level, the area irrigated more than once is 7.0 million hectares or 22.2 per cent of net irrigated area, whereas the area sown more than once is 24.6 million hectares or 17.7 per cent of net area sown in 1971-72. There is a popular misconception that the difference between the two is all rainfed. This is not correct, for, this difference also includes area on which two crops are grown, one of which is irrigated and the other rainfed, the second crop being grown on the residual moisture or with the help of rainfall. This explains why in terms of percentages the two figures are close. If irrigation was not available on bulk of this area even in one season, perhaps it would not have been possible to raise more than one crop in such land. Of course, there are areas which receive adequate rainfall to enable raising of two or more crops in a year without the aid of irrigation.

61.7.16 At present, for reporting the statistics of sourcewise irrigated area under LUS, only the main or major source of irrigation is generally taken into account in cases where a particular area

receives irrigation from two sources in a season. Because of this, the figures of area irrigated by the minor source are under-estimated. Further, for the purpose of periodical progress reports on irrigation works, full benefits are reckoned even in case where only partial irrigation is provided by a source in any season. Part of the discrepancy between the two sets of irrigation data arises because of this. One way of handling the matter is to collect separate information relating to the area irrigated by more than one source—canal-tubewell, canal-well etc. The figures would thus have to be collected for—

- (i) total area irrigated by public and private surface water projects including area under (iii),
- (ii) total groundwater irrigated area including area under (iii); and
- (iii) portion of the total area irrigated by public and private surface water projects which has received supplemental irrigation from groundwater.

Item (iii) would give information regarding the area making conjunctive use of surface and ground water, but it will not give a relative quantitative estimate of surface and ground water thus used. For making that assessment periodical sample surveys would be necessary. In working out the figures for total irrigated area those for item (iii) will have to be subtracted from the sum total of (i) and (ii). In the field, figures for (iii) should be recorded by the agency recording (ii).

61.7.17 There is scope for improving the statistical coverage of the annual Administration Reports prepared by the Irrigation Departments. For example, information regarding the availability and status of water supply at the source of the irrigation systems, taking into account seasonal fluctuations, command areas and intensities of irrigation for which the projects are planned, the norms in regard to the duty of water or water allowances adopted in the design of the projects, and the cropping patterns for which the projects have been designed as well as the actual cropping patterns needs to be collected and published. We have given some specimen returns in Appendix 61.8 which the States should adopt. Where it is not possible to collect some of the information through the prescribed returns (e.g. number of waterings and their intervals), periodical sample surveys should be conducted in the command areas of irrigation projects. We recommend that the Annual Administration Reports together with statistical data prescribed in the returns should be published immediately after the year is over.

These data should also be consolidated at the all-India level and published every year.

Drainage Statistics

61.7.18 Although absence of drainage is a major problem in several areas of the country, no accurate data are available regarding the extent of the problem, which is acute particularly in the case of rice in coastal areas, and in the diara areas of the larger rivers. Two types of data are relevant in this connection. The first is area benefited by the drainage schemes. This information can be collected from the progress reports on the schemes. The second and more important is the enumeration of area for which drainage facilities are inadequate. Even at present in the preliminary crop-cutting returns, information is called for on the level of land, specially in the case of paddy. The fields are categorised into high (or uplands), medium or low. This information can be tabulated once in five years, as proposed in Section 14 of this Chapter.

Organisational Set-up

61.7.19. We suggest that for handling the collection and analysis of irrigation statistics there should be appropriate statistical Units in the State Departments of Irrigation and there should be close coordination between this statistical unit and the Statistician in charge of agricultural statistics in the State. At the Centre, such coordination has been recently achieved in as much as that the Economic and Statistical Adviser to the Ministry of Agriculture and Irrigation would be in overall charge of the statistical matters of all the Departments in the Ministry.

8 LIVESTOCK STATISTICS

Current Status

61.8.1 The basic statistics in the sphere of animal husbandry comprise the data on number of different categories of livestock* their composition in terms of breeds, sex and age and the output of different livestock products and byproducts. The first census of cattle in British India was held during the winter season of 1919-20 and the second census was taken during the winter of 1924-25. It

*In this section, the term livestock includes poultry.

was subsequently felt that the period of enumeration, viz., December to April, adopted for the enumeration of cattle was too long and that the results were vitiated to some extent by inter-State movement of cattle during the period. The RCA also drew attention to this short-coming and recommended simultaneous conduct of the livestock census throughout the country. The period of enumeration for the subsequent censuses until 1951 was one month viz. January. The scope, coverage and the classification of the livestock census were expanded for the 1951 census and attempts were made to ensure the adoption of uniform concepts and definitions. A single day was adopted as the reference period. Adequate attention was also paid to the problem of training of primary staff and supervision over their work. In fact, rationalised supervision over the work of the primary enumerators formed an integral part of the census operations. In addition, a post-enumeration sample verification of census results was also introduced in 1956. Information on additional items like age and breed composition, immunisation against rinderpest, lactation period, calving interval were also collected by some States through the post-enumeration surveys.

61.8.2 The position with regard to the availability of statistics of livestock products such as milk, milk products, meat, eggs, wool, hides, skins, bones, bristles, animal casings and other products of animal origin is not satisfactory. No reliable estimates of cost of production of these products, which are a pre-requisite for assessing the economic viability of raising different types of livestock, are available. Till the late fifties, the only information available regarding the production of major livestock products, e.g. milk, eggs, wool and meat was from the marketing surveys carried out by the DMI at different points of time. As these surveys were not based on any objective methods of estimation, the data were found to be not quite reliable. The NSSO also collected information on the quantity and value of livestock products in some of their socio-economic rounds. The estimates thrown up by these surveys were of limited utility as the information was collected by the interview method and the results were not satisfactory.

61.8.3 Realising the need for securing precise and objective estimates of livestock production and also keeping in view the importance of collection of information on feeding and management practices of cattle, buffaloes, poultry, sheep, etc., the IARS carried out methodological studies with a view to determining the sampling techniques to be adopted for surveys in the field. The main features of the survey methodology developed were: (a) adequately large

and representative samples, (b) operation of the survey throughout the year to permit seasonal variations to be studied and averaged out in building up annual estimates, and (c) objective methods of collection of data on such items as milk and feed by direct weighing. Using the methodology arrived at as a result of such pilot investigations, large scale sample surveys were carried out in several States and on the basis of these surveys objective estimates of production of milk, wool and eggs were framed in 1966 at the all-India level. Subsequently, though some of the States did carry out sample surveys for estimation of one or more of the livestock products, these were not carried out on a regular basis in all the States and as such, it was not possible to build up reliable all-India estimates for any of these livestock products.

61.8.4 Apart from the basic data on numbers of livestock and output, a lot of useful information is being collected on the developmental aspects of animal husbandry programmes. For example, under the Intensive Cattle Development Projects (ICDP) data on artificial inseminations carried out and incidence of disease are collected through periodical progress reports. In the ICDP areas bench mark and repeat surveys have been carried out by some States to provide information on the progress of the projects. Data on market prices of livestock products are also being collected. In some States, systematic milk recording of selected animals in key village blocks and other areas falling under the cattle development projects has been taken up. Some of these data are published in the administrative reports of the State Animal Husbandry Departments. In addition, *ad-hoc* surveys on cost of production of milk and impact of milk supply schemes on the rural economy were carried out in some States to meet their specific needs. Information regarding slaughter of animals in recognised slaughter houses, inter-State movement of animals by rail and imports and exports of livestock and livestock products is also being collected regularly.

Improvements in Livestock Census

61.8.5 We have noted that the quinquennial livestock census which was due on April 15, 1971 could not be taken that year and was postponed to April 15, 1972 and even then the census could not be taken uniformly in all the States at that point of time. It had to be postponed to September, 1972 in Himachal Pradesh and November, 1972 in Jammu & Kashmir, Karnataka and Meghalaya. In Tamil Nadu the census was taken with March 1, 1974 as the

reference date. Consequently, the census results were available at the all-India level only in November, 1974. It is important that the census should be undertaken simultaneously in all the States and Union Territories and that arrangements should be streamlined in such a way that the consolidated results are published with a minimum time-lag. Further, the practice of having a post-enumeration check by an independent statistical agency in addition to the rationalised supervision by State agencies should be revived. Information to be collected in the livestock census on complete-enumeration basis should be confined only to the major items and classifications. Additional details should be covered through sample surveys. This would enable speedier tabulation and hence quicker availability of the census results. For example, while the complete-enumeration census may be confined to the classification of cattle and other livestock into broad use-classes, further details regarding the breeds etc. should be obtained through the sample surveys. We also suggest that the census of fishing crafts and tackle may be separated from the livestock census, while the agency for the collection of data at the village level may remain the same.

61.8.6 A definite schedule for reporting and consolidation of census data at different levels should be laid down. State reports and the all-India report giving the estimates of livestock population should be available within one year of the completion of the census. Advance tabulation of a ten per cent sample of the livestock households in respect of the more important items in the list should also be undertaken in the interest of bringing out advance reports on the census results within a few months of its completion.

61.8.7 The average life of an animal varies from species to species and in many species the useful life of an animal is limited. A question has been raised whether in view of this, the frequency of the periodical livestock censuses should be increased and the inter-census interval decreased and whether an annual census is necessary. We feel that while it is absolutely essential to have reliable information on the numbers of livestock every year, it will not be necessary to conduct a livestock census every year on all-India scale. This information can be collected through integrated sample surveys discussed under the next sub-section.

Improvements in Livestock Products Statistics

61.8.8 Although fairly detailed information on the numbers of livestock based on livestock census is available once in five years,

similar reliable information on the output of livestock products is not yet available, on a systematic basis. Once the methodology was developed, it was thought that the State Governments would adopt the techniques and carry out regular surveys for estimating the livestock products leading to the all-India estimates. However, collection of statistics is not being given the high priority that it deserves in the allocation of financial resources for such schemes under the five year plans.

61.8.9 Unlike crop yields which are harvested at specified points of time in a year, milk and eggs are obtained almost every day and in the case of milk at different times in the same day. Thus, estimation of yield of milk and eggs has posed certain methodological problems in organising sample surveys. As these have now been resolved, the State Governments should give the highest priority to organising sample surveys for obtaining reliable estimates of production of milk and other livestock products, which are essential for scientific planning for development as also for assessing the overall progress.

Integrated Surveys

61.8.10 The IARS has been engaged in evolving a suitable design for undertaking integrated surveys for obtaining estimates of output of livestock products and numbers of various categories of livestock spread over a period of five years. The intention is that every year one main livestock product should be selected and studied sufficiently intensively so that reliable information on the number of animals and the output of that product together with related information on feeding and other animal husbandry practices associated with that species is collected. In the other years, only indices of change in the numbers and output in relation to the base year are worked out. However, so far no report has been brought out by the IARS on these surveys. We feel that the concept of integrated survey is sound in principle and that the methodology should be finalized quickly. Till then, sample surveys for different livestock products should be continued. With the setting up of statistical units in the Animal Husbandry Departments of all the States, it should be possible to extend these surveys to all the States and all the livestock products. We also recommend that the system of periodical release of all-India and State estimates of livestock products should be introduced, as soon as practicable. The details of the timing of these estimates and their scope and coverage should be

worked out. It is also noted that the Thirtieth Round of the NSS which started in July, 1975 is devoted to the estimation of livestock products and to the study of the economics of livestock enterprise.

Improvements in Other Data

61.8.11 As already mentioned, data on improved breeds of livestock and poultry should also be collected through sample surveys on a systematic basis. Various types of other statistics related to the livestock economy are needed to meet the present-day requirements of planning for livestock development. The periodicity of their collection and the methodology to be adopted depend on the nature and magnitude of the variation in the items. For example, while data on livestock numbers should continue to be collected on a complete-enumeration basis once in five years, data on variations in numbers should be collected through annual sample surveys. Data on wholesale and retail prices of livestock, livestock products and livestock feed and fodder should be collected at selected centres on a weekly basis. These would be useful in more objective evaluation of the value of output from the animal husbandry sector. Information regarding market arrivals of major livestock products should be collected at weekly intervals. Data on production of livestock feed including cattle, poultry and other feeds should be collected from the major units producing these feeds on a monthly basis. Data on fodder should be collected on a seasonal or annual basis. With the rapid development of processing of livestock products, the methods of marketing and the proportions of livestock products converted into various indigenous products such as butter, ghee, cheese, etc. are also changing. The DMI should carry out fresh marketing surveys to collect upto-date information in respect of these items.

61.8.12 Monitoring and evaluation of development programmes: A number of development programmes are being implemented for increasing the production and availability of livestock products. For assessing the progress of programmes at various stages of implementation as well as measuring the impact of these programmes, data on indicators of various activities should be systematically collected, processed and analysed. For instance, in the field of cattle development programmes, the items of information should relate to the number of artificial inseminations carried out, number followed up, number found successful, number of cross-bred calves born, number of cross-bred cows in production, number of bulls castrated, number of vac-

cinations against rinderpest and foot and mouth disease, etc. These data should be reported regularly by the development staff provided under the programmes and appropriately compiled and analysed. In addition statistical staff should undertake surveys for assessment and evaluation of different programmes.

61.8.13 Collection of data from dairy and other plants: With the organisation of dairy plants and improved arrangements for collection and processing of data, a lot of useful information could be collected in respect of these plants. For example information regarding the quantity of fresh milk procured and processed by the plants and prices paid can be collected on the basis of prescribed returns by each dairy plant. Similarly the amount of milk processed into different livestock products and their production can also be collected through prescribed returns. The livestock statistics unit in the Animal Husbandry Division of the Ministry of Agriculture and Irrigation should study the nature of data at present being maintained in the dairy plants for their own normal administrative purposes and prescribe standard proformas through which this information could be collected, compiled, tabulated and analysed at the State and all-India levels. As in the case of dairy plants, information should also be collected, compiled and processed in respect of plants handling other livestock products such as slaughter houses, bacon factories, poultry dressing plants, feed manufacturing plants, bone digesters, etc.

61.8.14 Collection of data through development staff: One of the reasons for the limited availability of data on animal husbandry hitherto was the non-availability of technical staff in the field. With the expansion of the animal husbandry and dairy development programmes, a large number of field staff with qualifications and experience in animal husbandry development are available in the field at different levels. It is necessary that information regarding the developmental aspects of animal husbandry programmes should be collected through this field staff. While it is not intended that the field staff should be burdened with a lot of paper work involved in the submission of progress reports, yet it would be possible to collect valuable data on the implementation of these programmes if these are reported regularly by the implementing agencies and are consolidated at successive levels. There is a feeling that the data reported by developmental agencies are likely to exaggerate the development work, but this tendency could be checked by greater supervision by the supervisory authorities at successive higher levels, supplemented by a small statistical staff engaged in planning, coordinating and

compiling the data generated. For example, systematic milk recording needs to be introduced in all the key village blocks and in the ICDPs.

61.8.15 Quarterly district reports on livestock situation: There is need for developing a proper system of reporting detailed data on the livestock situation from the districts. In the context of planning, it will be useful to develop a system of reporting, on quarterly basis, the prevailing conditions relating to season, climate, incidence of disease, availability of animal feed and fodder, price situation of livestock and livestock products etc. to the State headquarters.

Types of Data and Periodicity

61.8.16 The types of data to be collected, the level at which they are required, the periodicity and the mode of collection are given in the Table 61.2.

TABLE 61.2
Periodicity and Mode of Collection of Livestock Statistics

Type of statistics	Level at which required	Periodicity	Mode of collection
1	2	3	4
1. (a) Livestock numbers			
(i) Selected items	Village and upwards	Quinquennial	Complete census
(ii) Other items	District/State	Do.	Sample survey
(b) Variations in numbers	State	Annual	Do.
2. Average yield and output of livestock products	District and State	Season and annual	Do.
3. Mortality among animals	Do.	Monthly	Prescribed return
4. Consumption and utilisation of livestock products	Do.	Season and annual	Sample survey
5. Wholesale and retail prices of	Selected centres	Weekly	Prescribed return
(a) Livestock			
(b) Livestock Products			
(c) Components of live-stock, feed and fodder			

1	2	3	4
6. Market arrivals of major livestock products	Selected centres	Weekly	Prescribed return
7. Trade in livestock and products	State	Monthly	Do.
8. Dairy Plants			
(a) Capacity and average through-put	Unit-wise	Annual/monthly	Do.
(b) Procurement/sale Price	Do.	Do.	Do.
(c) Utilisation of milk	Do.	Do.	Do.
9. Slaughter houses	Do.	Do.	Do.
10. Production of livestock feed for cattle, poultry and other	Do.	Monthly	Do.
11. Production of fodder	District and State	Season and annual	Sample survey
12. Cost of production of livestock products and indices	Region	Annual	Do.
13. Assessment and evaluation of development programmes	Project-wise	Do.	Do.
14. Report on condition of livestock situation	District	Quarterly	Prescribed return
15. Economic and technical data on livestock economy	—	Ad-hoc	Sample survey
16. Data needed for cattle insurance	District	Periodical	Special studies

Organisational Set-up

61.8.17 The collection of comprehensive data is possible only when a proper organisational set-up is established from the district

to the State and all-India levels. At the district level, the District Animal Husbandry Officer should have the help of requisite computational and other staff to help him in the collection, compilation and submission of various types of animal husbandry, dairying and animal health statistics. At the State level, the Director of Animal Husbandry should have a full-fledged statistical division to serve the requirements of data on various facets of livestock economy for proper planning, execution of plans and appraisal of development programmes. This division should also be responsible for collection, compilation, analysis and dissemination of all animal husbandry statistics. During the last decade or so, statistical cells have been set up in many of the State Animal Husbandry and Dairy Departments. However, due to lack of appreciation of the importance of these data, these units could not be developed fully as adequate financial support was not made available for their development in the successive five year plans. It is important that each State should have a fairly senior statistician not below the rank of a Joint Director of Animal Husbandry attached to the Directorate of Animal Husbandry. The division should consist of the three units, viz. assessment unit, analytical unit and livestock census unit, for undertaking large scale sample bench-mark and assessment surveys of development projects, surveys on cost of production of livestock products, analysis of breeding data, progeny testing, sire evaluation, operational research, planning of livestock census, publication and dissemination of livestock data etc. Each of these units should be under the charge of a professional statistician of a suitable rank. The statisticians in the Directorate of Animal Husbandry should be in the general line of promotion in the field of statistics in the State. For economic analysis of the various projects and for undertaking evaluation studies in the State, an economist of a suitable rank should also be provided in the division. The major dairy plants should also have economists on their staff to render advice on the pattern of rational conversion of milk into various products.

61.8.18 At the Central level, the statistical work should continue to be coordinated by the Statistical Unit in the Animal Husbandry Division in the Ministry of Agriculture and Irrigation which should be considerably strengthened. For undertaking evaluation and cost-benefit studies and for economic analysis of various projects, an economist of Joint Director level should also be provided in this Unit. The officer in charge of this Unit should be of the rank of Additional Economic and Statistical Adviser.

61.8.19 The units at the Central and State levels should continue to be under the administrative control of the Animal Husbandry

Commissioner or the Director of Animal Husbandry as the case may be, but in technical matters their work should be supervised by the Economic and Statistical Adviser in the Ministry of Agriculture and Irrigation at the Centre and the State Agricultural Statistician in the States.

61.8.20 When the integrated and other sample surveys for providing inter-census estimates of livestock numbers, estimation of production of various livestock products including by-products, cost of production studies, etc. are conducted, new problems both methodological and others, will arise from time to time. There should be provision for undertaking methodological research and pilot investigations. This work should continue to be done at the Centre by the IARS. Similar methodological studies should also be taken up by agricultural universities with financial assistance from the Centre.

9 FISHERIES STATISTICS

Current Status

61.9.1 India has a vast coastline of 5,600 km with varying extent of continental shelf. Inland fisheries resources covering both fresh and brackish waters extend over 9.6 Mha and are in the form of long rivers, big lakes, reservoirs, estuaries, tanks, canals, swamps and ponds. However, there is no precise estimate of potential resources of marine, inland and estuarine fisheries. With regard to inland and estuarine fisheries, reliable figures of estimated annual catches even are not available. However, for marine fisheries, all-India estimates of production with their State-wise break-up are collected by the Central Marine Fisheries Research Institute, (CMFRI) through a sample survey. Some of the States also conduct sample surveys to estimate the marine fish catches. As regard inland fish production the only data available, prior to 1961, were those based on the marketing surveys undertaken by the Directorate of Marketing and Inspection (DMI). After 1961, States are furnishing some information, though not reliable, on the estimated catches of inland fish based on the quantities of fry and fingerling distributed, amounts of lease money realised, quantities marked and other factors.

61.9.2 data on number of fishing crafts and tackle were collected on complete enumeration basis as part of all-India livestock censuses carried out in 1966 and 1972. Information was collected on mechanised boats, non-mechanised crafts and fishing gears. The details of

classification adopted for the 1972 livestock census, are given in Appendix 61.9.

Marine Fish Catches

61.9.3 The CMFRI, obtains data regarding total landings of marine fish by mechanised and non-mechanised boats and their variety-wise composition for each maritime State, the total effort in terms of man-hours spent on fishing, the number of units operated and the size composition of the landings in respect of selected species, on the basis of sample surveys. In the case of landing by trawlers, the information on catches is obtained through complete enumeration. The survey provides Statewise estimates of catches of fish for each month. The sampling error of the estimate of production based on the survey is as high as 4 to 5 per cent, even at the all-India level. The estimates worked out by the States on the basis of independent sample surveys and those obtained from the sample survey carried out by the CMFRI differ considerably. There is need for reconciling the differences between the two sets of figures. As long as the two surveys are carried out independently, the discrepancies are bound to persist. We would, therefore, suggest that the Fisheries Division in the Ministry of Agriculture and Irrigation and the representatives of the CMFRI, the concerned State Governments, IARS and the NSSO should get together and discuss the possibilities of having an integrated sample survey. The design of the sample should be so drawn up as to provide annual all-India estimates with a reasonable degree of precision, say, 2 per cent. The primary enumerating staff for conducting these investigations may belong to the State Departments of Fisheries. In addition to the State supervision, statistical staff of the CMFRI could be used to supervise the sample surveys conducted by the States. The CMFRI staff could also collect biometric data in which the CMFRI is interested. Such an integrated scheme would, besides improving the reliability of the data, also avoid a situation in which the Centre and States give two different sets of figures.

Inland Fish Production

61.9.4 With regard to inland fisheries, we understand that the NSSO is undertaking pilot investigations with a view to evolving appropriate methodology. In 1962-63, the Directorate of National

Sample Survey conducted pilot surveys in three districts of Orissa, viz., Cuttack, Mayurbhanj and Sambalpur, for estimating the fish catches from impounded waters like ponds, tanks, swamps, etc. Based on the experience gained in that survey, the NSSO have initiated integrated pilot surveys in Murshidabad district in West Bengal, Karimnagar in Andhra Pradesh and Madurai in Tamil Nadu. The surveys cover (a) estimation of water areas of tanks, ponds, rivers, canals and reservoirs, (b) estimation of fish catches per hectare of water area both by enquiry and by direct physical observation, (c) household fish consumption, and (d) fish marketing including volume of sales, sources and supply of fish in wholesale stalls. The output from both capture and culture fishing in inland waters is bound to increase in the light of measures discussed in Chapter 37 on Inland Fisheries and Aquaculture. It is important to have reliable estimates of production of inland fish and the evolution of appropriate scientific methods is an essential prerequisite. We recommend that the pilot investigations including the estimation of the catches from captive fishery resources should be completed early and appropriate methodology should be made available to State Governments for implementation.

Integrated programme

61.9.5 The Technical Committee on Coordination of Fisheries Statistics (1950) recommended an integrated programme of statistical work for organizing the collection of statistics both for administrative purposes as well as for planning the future development of Indian fisheries. Very little action was, however, taken on the recommendations of this Committee which are valid even today after a lapse of twenty-five years. There are still a large number of gaps in the coverage of fisheries statistics and no headway has been made in effecting improvements therein. We recommend the collection of the following types of statistic at intervals noted against each:

(i) basic statistics	periodicity
(a) fishermen population	decennial
(b) fishing crafts, tackle nets (gears)	quinquennial
(c) inland water resources (marine/inland)	quinquennial
(d) biological and research statistics	periodical
(e) fish production marine and inland (species-wise & gear-wise)	monthly

(ii) <u>ancillary statistics</u>	<u>periodicity</u>
(a) prices (producer's price at first transaction, whole sale and retail prices)	weekly
(b) market arrivals and sources of supply	weekly
(c) utilisation of fish catch	monthly
(d) household consumption	periodical
(e) trade (external as well as internal)	monthly
(f) mechanisation of boats	annual
(g) ice and cold storage and preservation plants (capacity etc.)	annual

Census of Fishing Crafts, Tackles and Nets

61.9.6 As already suggested in paragraph 61.8.5, census of fishing crafts, tackle and nets should be separated from the livestock census. This census should be conducted by the State Fisheries Departments under the overall technical guidance and control of the Statistical Unit in the Fisheries Division of the Ministry of Agriculture and Irrigation. The agency of Patwaris, etc. should be utilised for field work, as in the case of the livestock census, after adequate training in concepts, definitions, etc.

Fisheries Resources

61.9.7 For planning the development of inland fisheries, it is necessary to have a critical assessment of the total inland fisheries resources available for development as well as those being exploited at present. The inland fisheries resources being biological in nature, are continuously changing due to complex inter-relationship of various biotic and abiotic factors. It is, therefore, necessary to surveys these resources periodically, specially with reference to geographical, physical, chemical and biological factors. The inland fish resources should be classified according to size of water area, depth, salinity, soil type, production potential, degree of utilisation, culture/capture practices, yield rates, etc.

61.9.8 With regard to marine fisheries resources, a continuous resources survey is necessary to collect information on various biological characteristics such as growth, recruitment, mortality, measure-

ment of lengths, age determinants etc. Information on these basic parameters is important for the evaluation of yield from fishery under varying biological and environmental factors and for working out suitable population models for studying the dynamics of exploitation. It is also necessary to prepare an upto date inventory of all marine resources such as length of coastline, area of continental shelf, number of marine villages, number of active fishermen, etc. Such a survey should be conducted at least once in five years by the CMFRI with the help of the State Governments. Data on number of fishermen is already being collected through the population census once in ten years.

Mechanisation of Boats

61.9.9 Every year a number of mechanised boats are introduced for marine fishing. While new boats are introduced, some of the existing boats go out of use each year. A mere periodical census as on a day might not bring to light the exact number of boats etc., available even in the census year. It would be desirable to have a registration of small mechanised boats of size below 25 gross registered tonnage (GRT). This would be useful not only from the point of maintaining statistics but also for keeping a watch on the growth of mechanisation.

61.9.10 With regard to larger vessels above 25 GRT, even now, in the course of their operation lot of information relating to operational details and performance of the vessels, specially in the context of commercial fishing becomes available; but it is necessary to collect and analyse these data systematically for working out the economics of deep-sea fishing and for demonstrating its potentialities.

Seed Fish Statistics

61.9.11 Statistics of seed fish were till recently not collected in an organised manner by most of the States. The Fish Seed Committee (1963) gave some idea of production of spawn, fry and fingerlings for 1964-65. For subsequent years, the States have been collecting the required data, though their coverage has been found to be incomplete. As the State Departments of Fisheries broadly know the centres for production of spawn, fry and fingerlings, both private and departmental, they should collect reliable estimates of seed fish available or further development. It is also necessary to develop appropriate technical coefficients such as mortality at various stages of fish growth, etc.

Prices, Market Arrivals and Other Statistics

61.9.12 Adequate arrangements are also necessary for collecting data on producers', wholesale and retail prices of different categories of fish. Difficulties of specification of price quotation are likely to arise, particularly as the price of fish depends upon the variety, the size, the consumer preference and the state of freshness of the fish. It becomes sometimes difficult to apply the concept of model price to transactions in fish. What is, however, important is to see that reliable data on prices of fish are collected for standard varieties and pre-determined specifications. With regard to market arrivals, it is suggested that, as a first step, arrangements should be made with the municipalities and municipal corporations for collection of data on market arrivals of fish on a periodical basis. Similar information should also be collected on the quantities of fish stored in cold storage etc. Data on utilisation of fish and also processing need to be collected at periodical intervals.

61.9.13 There is also scope and need for compiling derived statistics such as index numbers of production of fish and of prices. Once reliable data on production, prices and inputs are available, it should be possible to work out the contribution of fisheries sector to the national income more accurately.

Trade Statistics

61.9.14 Statistics of foreign trade in fish and fishery products are published as part of the general import/export trade by the Ministry of Commerce. But one important gap in the available data is the absence of information regarding unit value realisation of marine products exported from India. Marine Products Export Development Authority should undertake an analysis of the unit value realised by the various items from India in important foreign markets along with the corresponding unit values realised for similar products by other countries. This analysis will be helpful in exploring the possibilities of diversification of exports of marine products.

61.9.15 Efforts should be made to collect statistics of internal trade and movements covering rail, river and road-borne traffic. As proper arrangements for refrigerated transport are essential for a perishable commodity like fish, data on internal trade and movements are important.

Other Data

61.9.16 Periodical evaluation of the various fisheries projects at the Central and State levels is necessary to provide guidance on the formulation and implementation of the development programmes. Another important data requirement is in respect of cost of production of fish. Appropriate methodology has to be developed for this purpose.

Organisational Set-up

61.9.17 For proper development of fisheries statistics on the lines indicated in the foregoing paragraphs, it is necessary to set up suitable organisations or strengthen the existing ones for the collection, compilation and analysis of data at different levels. Very few States have full-fledged statistical units in the Fisheries Departments to look after the collection and compilation of fisheries statistics. We, therefore, recommend that every State should have a strong Statistical Unit in the Fisheries Department manned by properly qualified statisticians and other statistical personnel, to deal with all aspects of fisheries statistics. At the Central level, the Fisheries Statistics Unit, located in the Fisheries Division should be strengthened and placed under a Joint Director, who should work in close collaboration with the DES. For economic analysis of the various projects and undertaking evaluation studies an economist should be added to the Fisheries Statistics Unit at the Central and State levels.

61.9.18 The Central fisheries institutes like the CMFRI, CIFRI and CIFT have regular statistical units for the collection and interpretation of statistical data. With increasing emphasis on research data for proper evaluation and assessment of potential of inland and marine resources and progress of their exploitation, these units will have to undertake larger responsibilities. They should, therefore, be suitably strengthened with qualified staff at various levels. For the work of economic evaluation in the field of fish culture, fishing practices, as also the economic suitability of various types of engines, crafts and gears, the assistance of economists should be provided to the statistical units in these institutes.

10 FORESTRY STATISTICS

Scope

61.10.1 Collection of forestry statistics was initiated to meet the

administrative needs of the Forest Departments and was largely a byproduct of administrative reports of the Forest Departments of State. Up to 1946-47, data on a small number of items of forestry were collected and published in respect of the British India alone. After Independence, with the integration of the Princely States, the coverage of the statistics was gradually extended to the forests located in the former Princely States also.

61.10.2 The principal forest statistics relate to area under forests, volume of standing timber and firewood, quantity and value of outturn of timber, firewood, and minor forest produce, employment in forestry and forest industries, foreign trade and data on revenue and expenditure. Miscellaneous information on the progress of working plans, breaches of forest rules and grazing of cattle in government forests is also collected. The scope of the forest statistics has been expanded since 1958-59 to include data on area afforested and deforested, area surveyed, classification of forests by management status, silvicultural system and density, outturn of logs and sleepers, and wholesale prices of forest produce. These data which are collected through the State Departments of Forests are compiled and published at the Centre by the DES which maintains close liaison with the Inspector General of Forests. The Central Forestry Commission which was set up in 1965, collects data on certain aspects of forestry such as area under forests by ownership, legal status, composition, outturn of forest produce etc. in standardised forms referred to in Chapter 46 on Forest Planning, Research and Education. It also collects information on a few additional items required for planning in forestry.

Defects

61.10.3 Even today the available data do not fully meet the needs of planning. There is considerable time-lag in the availability of forest statistics and complete information is not available in respect of forest under other civil authorities, corporate bodies and private individuals. There is also a large discrepancy between the area under forests as published in Indian Forest Statistics and the figures published in Indian Agricultural Statistics. There is also need for enlarging the scope of the forest statistics.

Reconciliation of Discrepancy

61.10.4 As already mentioned in paragraph 61.2.10, LUS also provides data on area under forests. According to LUS, the total

area under forests in 1970-71 is 66.0 Mha. The areas as reported in Indian Forest Statistics aggregate to 74.8 Mha. There is thus a wide difference of 8.8 Mha between the two sets of figures. The differences are large in some of the States and are in either direction as will be seen from Appendix 61.10. The question of reconciling the discrepancy between the two sets of figures has been receiving attention in the Ministry of Agriculture and Irrigation for quite a long time. At one time it was thought that the major part of the difference between the two sets of figures was due to differences in the definitions adopted for the two types of data. According to the CIAS, the recommended definition for forest is as follows:—

“Area under forests includes all lands classed as forests in any legal enactment dealing with forests and administered as forests irrespective of whether these are State-owned or private and whether wooded or managed as potential forest land.”

Uniform adoption of the definition for both LUS and forest statistics does not eliminate completely the sources of discrepancy between the two sets of figures. It is necessary that at the State level, the Chief Conservator of Forests and the crop reporting authority should get together and take steps to eliminate the differences. Clear-cut procedures should be laid down for updating of the records every year and publication of one set of figures by both the agencies. Perhaps, the reconciliation has to be attempted at the district level between the divisional Forest Officer and the officer in charge of agricultural statistics at the district level.

Classification

61.10.5 Detailed data on the area under ‘coniferous’ or soft wood and ‘non-coniferous’ or broad leaved forests are reported by State Forest Departments according to types of ownership. The data are separately reported for forest area under State Forest Departments and other civil authorities, corporate bodies and private individuals. The emphasis on forestry development is on economic management or exploitation of the forests as sources of forest products. This calls for a further classification into ‘merchantable forests’ and ‘others’ as also ‘unprofitable or inaccessible’. Data on area under forests according to legal status, i.e. ‘reserved’, ‘protected’ and ‘un-classed’ are also being collected for coniferous and non-coniferous forests separately. Some of the data are available according to species such as *deodar*, *chir*, *kail* and *fir* among coniferous trees, and *sal*, *teak*, *sisso* dipterocarps and others in non-coniferous species.

51.10.6 With regard to classification, the importance of the various types of wood varies from State to State. We recommend that while the State Governments may adopt a more detailed classification for collection of the information in their own State they should collect the data on the uniform classification so that compilation at all-India level becomes possible. Statistics should also be collected according to functional classification viz protection forests, production forests and social forests referred to in Chapter 41 on Forest Policy.

Outturn of Major and Minor Forest Produce

61.10.7 Statistics of outturn of major forest produce are at present available for timber, fuel, logs, sleepers, etc. both in terms of quantity and value. These data are classified into 'coniferous' and 'non-coniferous' wood. Separate data are also to be reported for sawn timber, round wood, and fuelwood including charcoal wood and wood for distillation. Data on outturn are available for selected species such as *deodar*, *chir*, *kail*, *sal*, *teak*, *sisso*, *simul* and dipterocarps. In regard to minor forest produce, only statistics of value of production are available for bamboos and canes, drugs, fibres and flosses, fodder and grazing and grass other than fodder. Data are also available for lac, gums and resins, dye-stuffs, tanning materials, bidi leaves, vegetable oils and seeds, charcoal, ivory honey and beeswax. The basic defect with the data of forest produce is that they relate only to the forests under the control of State Forest Departments who report data with regard to authorised removals only. Secondly, there is considerable quantity of timber and fuelwood grown outside the forest lands. Suitable procedures have to be devised to frame estimates of unrecorded production through sample surveys or otherwise at least once in five years. The possibility of collecting data on timber and fuelwood from agricultural lands through the periodical agricultural censuses should be examined.

61.10.8 Generally the coupes are auctioned in a standing position and so the figures of produce removed by the contractors lack accuracy. Hence, there is need for varifying the reported figures through sample checks. In the case of minor forest produce, quantitative estimates of outturn are not reported for several items. With greater emphasis on the exploitation of minor forest produce and better organisation of the agencies for collection of these produce, the need for getting improved data on both quantity and value becomes obvious. Sometimes, when the rights for exploitation of minor forest

produce are auctioned, it may be difficult to get actual figures. Special efforts are needed to get reliable estimates of minor forest produce both in terms of quantity and value. As an example of how better statistics will help in better administration it may be mentioned that in Madhya Pradesh after nationalisation of trade in tendu leaves, the revenue from tendu leaves shot up from Rs. 86 lakhs in 1963-64 to Rs. 812 lakhs in 1968-69. This was largely due to complete reporting of all tendu leaves collected. For evaluating the output, of both major and minor forest products the question arises as to the point at which the value is to be reckoned. For ensuring inter-State uniformity and correct estimation of the contribution to the national income from the forestry sector, the concept of value of output should be clearly defined and should relate to the value at the first point of sale by the Forest Departments.

Prices and Costs

61.10.9 Data on annual average wholesale prices of various species of timber, sleepers, fuelwood, pulpwood and plywood are reported for important assembling and marketing centres in different States. The scope of these statistics needs to be enlarged. Wholesale prices according to species and types of produce should be collected by size-classes at coup sites. Government depots and important assembling and marketing centres at intervals of a fortnight or a month. Wholesale prices of minor forest produce should also be collected regularly on a monthly basis to start with. For a study of the trends in prices of forest produce, compilation of index numbers of wholesale prices of timber, fuelwood and other forest produce should be initiated. Forestry items should also be included in the scope of the All-India Index Number of Wholesale Prices.

61.10.10 For indicating the lines on which improvement in the efficiency of forest management can be achieved a careful analysis of the costs of various operations from the stage of plantations to the actual marketing of timber is necessary. As these forest operations and management are done through departmental agencies, it should be possible to work out these costs on the basis of available data. What is important is to bring in the economic concepts and the usual principles of costing and making the data available either as part of administration reports or as a regular series. Similarly compilation of data on cost of collection of minor forest produce together with the data in prices received for them would throw light on the measures necessary for improving the efficiency of collection of minor forest produce.

Employment in Forestry

61.10.11 The State Forest Departments report at present the number of persons employed annually in management, extraction and primary and secondary industries under various categories. Data on permanent and temporary labour force are also reported by some States. The available data, however, are incomplete and lack uniformity. In view of the highly labour intensive nature of the forestry sector, we recommend that regular data on labour employed in activities such as forest plantations, silvicultural operations, communications, tree-felling, transport, collection of forest produce and primary and secondary industries should be collected according to uniform concepts and definitions. Separate data for skilled and unskilled labour, source of labour—whether local or migrant and status of labour—whether wholly or partly dependent on forest occupations, should also be collected.

Forest Inventory Surveys

61.10.12 Forest inventory surveys are basic for a proper and planned exploitation of this national asset. The data that needs to be collected relate to the stocking of various species, gross increment, cuts, natural losses by fire, insects and diseases and climatic factors, potential increment, production of minor forest produce, etc. These surveys need not form part of regular, annual forest statistics. The proposals regarding forest inventory survey are fully dealt with in Chapter 46 on Forest Planning, Research and Education.

Organisational Set-up

61.10.13 Forest statistics, as already mentioned, are collected mainly as by-products of forest administration and management and would continue to be so. However, with increased requirements of statistical data for policy formulation, planning and implementation of forest development programmes, the existing agencies at different levels for collection of these data are inadequate and need to be strengthened. Range is the lowest administrative unit for forest management and at this level the Range Forest Officer is responsible for the collection and reporting of data in addition to his other duties. In order to enable the collection of the various types of data suggested by us, we are of the view that a full-time Forester (Statistics) should be provided in each range to attend to maintenance

of registers, culling out data from the records and reporting them to higher levels in the prescribed proformae. At the divisional level, the Divisional Forest Officer should be assisted by a Range Forest Officer (Statistics) on a whole-time basis for this work. In addition to consolidation of information at the divisional level, he should also visit the different ranges and verify the accuracy of the various types of data collected in the ranges. He may be assisted by a Junior Statistical Assistant in compiling and consolidating the returns. At the circle level, the statistical agency will consist of a Class II Statistical Officer, assisted by requisite complement of Statistical Assistants and Clerks. Their functions will be not only to consolidate the data received from the different divisions, but also to analyse and interpret the data so as to help in the planning and formulation of suitable programmes.

61.10.14 At the State headquarters, the Chief Conservator of Forests should be assisted by a Director of Forest Statistics of the rank of Conservator of Forests. He should be assisted by requisite number of statisticians to deal with different aspects of forestry statistics. Corresponding strengthening is necessary at the level of the Ministry of Agriculture and Irrigation also. The existing statistical unit in the Central Forestry Commission should be developed into a full fledged Statistical Division and put under the charge of a Statistician in an appropriate scale.

11 INPUT STATISTICS

61.11.1 In the field of fertilisers statistics, the data that are necessary are production, imports, quantities distributed by the different agencies namely, Government, cooperatives and private traders, consumption of fertilisers, stocks held at different levels and prices. The available data are incomplete and suffer from several inadequacies. Firstly, information on crop-wise consumption of fertilisers is not available. Secondly, the data on consumption do not tally with those worked out on the basis of production, imports and changes in stocks. In addition, more reliable information is also required with regard to consumption by different size classes of holdings, dosages of fertilisers, the time of their application, the constituents of mixed fertilisers, their responses etc. Wherever necessary, special surveys should be carried out to obtain this information. Data on inputs were also collected through the Agricultural Holdings Survey conducted by the NSS in its Twenty-sixth Round. It is also

possible to collect these data through the Comprehensive Scheme for Cost Cultivation of Crops.

61.11.2 Data on seed production is available in respect of seeds produced and distributed by the National Seeds Corporation. In addition, information on seeds distributed through Government agencies in the States is also available with the State Governments; but this information is not compiled at present at the Centre. Arrangements are also necessary for collecting the information from the private seed companies. Data on seed rates of different crops/varieties should be collected to assess the requirements of seeds in different seasons and regions.

61.11.3 Similarly data on quantities of pesticides produced and distributed, and those applied to different crops have to be collected systematically. Some information on this subject is available in the progress reports received from the States in respect of crop development programmes; but the data need to be improved both in scope and coverage.

61.11.4 With regard to agricultural implements and machinery, the only comprehensive information available, is that collected through the quinquennial livestock census. The list of items covered by the census should be reviewed at the time of each census to include new items of machinery and agricultural implements introduced in the country on a sufficient scale. In addition, data on tractors and other agricultural machinery produced and imported are also available; but these data need to be systematised.

61.11.5 Three types of statistics of inputs can be distinguished. The first relates to the data on inputs, viz., seeds, fertilizers, pesticides and agricultural machinery, produced, distributed and utilised for different crops, at different levels, viz., all-India, State and district. These are aggregative types of data most of which can be compiled on the basis of the returns furnished by the concerned manufacturing concerns and distribution agencies. Information on cropwise utilisation of inputs may have to be based on sample surveys. The second type of information relates to the use of inputs classified according to holdings on which they are used and their characteristics, identification of areas where consumption of fertilisers is poor, factors which inhibit consumption of fertilisers and impact of credit, weather, irrigation and prices on consumption of fertilisers. These have to be collected through periodic sample surveys discussed in Section 14. The third category of information deals with technical coefficients, dosages of fertilizers, seed rates and input application practices, responses to various inputs etc. These data also have to be based on

pecially conducted studies such as farm management investigations, cost of production studies, agricultural experiments, etc.

12 MARKET INTELLIGENCE

61.12.1 Fairly detailed, comprehensive and reliable data on wholesale prices of agricultural commodities are available in India. This is largely the result of the basic framework laid down by the Agricultural Prices Enquiry Committee, 1954 (Chairman: P. N. Thapar). Not only the reporting agencies were specified in the different markets but the concepts and nature of the quotations to be reported were also laid down. The DES through its market intelligence staff also maintains a close watch on the reporting of the prices. In India, as mentioned in Chapter 56 on Marketing, Transport and Storage, there are about 4,145 regular wholesale markets besides over 22,000 periodical markets or shandis held bi-weekly, weekly or fortnightly in rural areas. Of the total number of the wholesale markets 2,936 have already been regulated and the scope of regulation is being gradually extended to others. In important markets whole-time price reporters have been appointed under the Scheme for Improvement of Market Intelligence. There are about 550 such reporters working in different markets of the country which report regular price and other market data to the Centre as well as the States.

61.12.2 At the State level, the work regarding collection and reporting of prices and other market intelligence is looked after by Marketing Departments/Directorates in most of the States. Arrangements for supervision and training of price reporting agencies at centres other than those for which data are reported to the Government of India, need to be strengthened.

61.12.3 At the Centre the DES obtains telegraphically daily wholesale prices of foodgrains in respect of 140 markets covering primary, secondary and terminal markets. Weekly wholesale prices are collected from about 530 markets in respect of 130 agricultural commodities. Daily retail prices of foodgrains are collected from over 90 centres and weekly retail prices of agricultural commodities from 215 centres. Weekly data on market arrivals and stocks of important agricultural commodities are also reported from 1,300 markets spread all over the country. The DES also, collects lot of other market intelligence but the same is not published regularly.

61.12.4 Further improvements in market intelligence should be in the following directions:

- (i) Emphasis so far has been on current information. To improve the usefulness of price and other market intelligence efforts should be made to issue periodical reports on outlook for future to provide material for advance action to forestal local shortages, scarcities or glut.
- (ii) Market intelligence for pulses, edible oils, important fruits and vegetables, minor oilseeds and condiments and spices should be organised on the same lines as for cereals and fibres.
- (iii) The study on costs and margins should be extended to more centres and crops.
- (iv) All the regulated markets in the country should be made reporting centres for price collection. The States should have a bigger number of centres than that at present for their own use.
- (v) Whole-time technical reporting agencies should be set up in all the important whole-sale markets according to a phased programme.
- (vi) The scope of market news service should be extended gradually so as to increase the number of market and commodities in respect of which market news is disseminated by the All India Radio and through other media.

61.12.5 The DES collects periodical information regarding prices prevailing in important world markets for a few important agricultural commodities entering into the import-export trade. There is, however considerable time lag in the availability of the data. The coverage of the commodities and centres is also not adequate and needs to be enlarged. We suggest that the whole question of the scope and coverage of the foreign market intelligence should be reviewed in consultation with the Ministry of Commerce and adequate arrangements should be made for their systematic collection. The help of Indian Embassies and High Commissions abroad and foreign Embassies and High Commissions situated in India may be taken wherever necessary in collecting upto-date information.

61.12.6 With regard to stocks, the only complete and reliable data that are at present available are those relating to stocks of foodgrains held by the Government in their own godowns, or godowns of the Food Corporation of India. In the case of cash crops like cotton and jute data on stocks held by trade are available. Some data are also available with regard to stocks pledged with the banks. The market arrival returns also give some data on stocks, but these

are not very reliable. It is necessary to improve the availability of data on the stocks with farmers, consumers and various agencies such as wholesalers, retailers, etc. Even with regard to storage accommodation, although information regarding the total storage constructed by different agencies is available, its occupancy by commodity and period is not available. This information should also be collected. The CIAS should look into this question and evolve appropriate methodology for collecting complete data on stocks, periodically, which could be implemented thereafter.

13 AGRICULTURAL CENSUS

61.13.1 The approach to agricultural planning in India so far consisted mainly in setting out targets of production for different crops and other agricultural commodities at the national and State levels after taking into account the potential resources available under the plans. In the absence of the detailed data on existing and potential resources for various agro-climatic regions at the block and farm levels, the task of planning from below discussed in Chapter 60 on Planning, becomes difficult. In the ultimate analysis it is the farmer who takes the decision what to produce, when to produce and how much to produce. The programmes and incentives which are given to the farmer should also take cognisance of the basic characteristics of the farmer's holdings such as the size distribution, the pattern of land use, availability or otherwise of water and the resources in human, animal and mechanical power on the farm. It is in this context that agricultural census through complete enumeration of holdings to give the number, size and other characteristics of holdings, becomes important.

61.13.2 Till recently, one of the lacunae in the agricultural statistics system of the country was absence of data on cultivators' holdings in sufficient detail. Though data on operational holdings were collected by the NSSO as part of the socio-economic surveys, in the eighth, sixteenth, seventeenth and twentieth rounds, these were designed to provide data only at the all-India and State levels. Realising the importance of data on the structure and characteristics of agricultural holdings, the Government of India decided to conduct an agricultural census with 1970-71 as the reference year, as part of the 1970 World Agricultural Census sponsored by the FAO. The method adopted for the census was complete enumeration by re-tabulation of the data already available in the land records. In States

where land records are not maintained, e.g. West Bengal, Orissa, Kerala, Meghalaya, Nagaland and Manipur and a few Union Territories, the data were collected through a sample survey. The Ministry of Agriculture and Irrigation propose to repeat the Agricultural Census, but on a sample basis, with agricultural year 1976-77 as the reference year. We commend the proposal.

61.13.3 The main Agricultural Census through complete enumeration was confined to number and size of holdings, land use and crops grown, irrigation and tenancy. Data on input use and other related characteristics were collected in the States of West Bengal, Orissa, Kerala etc. in the 1971 Census. It is proposed to extend the scope of the input survey to all the States in the 1976-77 Census.

61.13.4 One of the basic difficulties that has been experienced in the Agricultural Census, 1971 has been that it could provide information on open tenancies only. Since concealed tenancies are not mentioned in the land records and as the method of retabulation from land records was adopted for the Agricultural Census, there was no means of getting correct information with regard to the *de facto* position of the actual cultivation of the land. In some States, though special steps were taken to collect information on who actually cultivated the land, in view of the various land reforms measures on the anvil, correct information regarding the concealed tenancies might not have been furnished. However, when land reforms legislation is implemented and when tenancies are regulated, and in particular when the rights of all the crop sharers are recorded, the situation is likely to improve, in future Agricultural Census.

61.13.5 Another gap in the information provided by the 1971 Census is that because of the method of collection of data adopted, information on fragmentation was also not available. In view of the need for this information particularly with regard to the priorities to be attached in implementing consolidation of holdings programme, we recommend that the data on fragmentation might be collected in the sample surveys proposed to be taken up in conjunction with the agricultural census.

61.13.6 The results of the 1970-71 Census became available only in December, 1975. While the reasons for the delay are understandable, the 1971 Census being the first of its kind in India, we could have made better use of the data if the information was available earlier. Special efforts are, therefore, necessary to see that the data for 1976-77 Census become available by the end of 1978 at the latest.

61.13.7 As already mentioned the NSSO undertook a survey of land holdings in 1971-72 in the twenty-sixth round to provide data on the structure of agriculture and use of chemical fertilisers and manures by specific types on irrigated and un-irrigated crops grown during the reference period *viz.*, 1970-71. The Statewise results of this survey have recently become available.

14 INTEGRATED SYSTEM OF AGRICULTURAL SURVEYS

61.14.1 A large variety of data on different aspects of agriculture are being collected at present. The needs for collection of data are expanding faster than the rate at which the improvements in statistics are taking place. The modernisation of Indian agriculture as envisaged by us and the agricultural planning techniques recommended would need the collection and compilation of a large quantity and variety of data with different periodicities. Obviously, all the data cannot be collected every year nor are these needed. For example, data on the structure of holdings need not be obtained every year as this does not show significant annual variations. Quinquennial censuses based on complete-enumeration or sample surveys will serve to throw light on the changes in the structure and characteristics of holdings. For meeting the data needs in the sphere of agriculture referred to in the different Sections, the best approach is to devise an integrated system of agricultural surveys covering both current agricultural surveys and periodical agricultural and livestock censuses. The integration essentially consists in combining, wherever feasible, surveys with the common sampling units and staggering the programme of collection of data over a period of five years, taking up a major group of items each year. Sample surveys can be superimposed on complete-enumeration enquiries both for checking up the reliability of the data and for providing additional information. The agencies for the collection of data can also be employed rationally by combining different surveys. We envisage primarily undertaking four types of surveys *viz.*:

- (i) those with field as the unit,
- (ii) those with holding as the unit,
- (iii) those with livestock holding as the unit, and
- (iv) cost of production enquiries.

All these together can form National Agricultural Surveys.

61.14.2 In the case of the surveys with field and holding as units, the items to be canvassed would relate to:

Field as a unit

- (i) improved seeds,
- (ii) fertilisers and manures,
- (iii) irrigation, drainage and soils,
- (iv) plant protection, and
- (v) cultivation practices and extension.

These can be covered by rotation over a period of five years. Holding as a unit

- (i) characteristics of holdings as in the agricultural census;
- (ii) data required for 'production and utilisation accounts';
- (iii) debt, investment and savings;
- (iv) employment, unemployment, underemployment, labour force and labour inputs, and
- (v) food consumption and nutrition.

These items can be covered in different years. In the field of animal husbandry, the five-year programme should successively cover:

- (i) quinquennial livestock census with a sample survey for the additional particulars about breeds and age-composition,
- (ii) milk and milk products.
- (iii) poultry and poultry products,
- (iv) wool,
- (v) meat and meat products and hides and skins.

Changes in livestock numbers and also in the output of products other than the main product under survey in a particular year can be studied every year. The cost of production surveys should also be conducted in a phased manner taking up for study different crops and animal husbandry products during the different years. Some of the integrated agricultural surveys can be dovetailed into the agricultural surveys being conducted under the auspices of the NSSO.

61.14.3 As techniques of agricultural planning are improved, a continuous appraisal of the resources of agricultural holdings will be necessary. It is possible to secure this information by obtaining data on selected characteristics in respect of a rotating sample of holdings continuously, year after year. This rotating sample may form a sub-sample of the main sample selected for the annual survey of holdings envisaged under the National Agricultural Surveys. This method is known as the Perpetual Inventory Method. We suggest that this development may be kept in view in the future agricultural statistics system of the country.

61.14.4 The surveys with the field as a unit can be combined with the crop cutting surveys at present carried out in different States

under the technical supervision of the NSSO. Even at present there is provision for giving the information on the various inputs in the preliminary return to be furnished by the primary agency immediately after the field is selected for crop-cutting. This information is at present not being tabulated. By reviewing the scope of the return and modifying it to provide details of information required each year, and tabulating the data collected, very useful information on the various inputs can be collected at very little extra cost.

61.14.5 After re-organisation, the NSSO even at present has a phased programme for collection of information on different items as part of socio-economic rounds as under:

- | | |
|-------------------------------------------------------------------------------------------------------------|---------------------|
| (i) population, births, deaths, disability, morbidity, fertility, maternity, child care and family planning | once in ten years. |
| (ii) debt and investment and capital formation | Do. |
| (iii) land-holdings and livestock enterprises | Do. |
| (iv) employment, unemployment rural labour enquiry and consumer expenditure | twice in ten years. |
| (v) self-employment in non-agricultural sector | Do. |

The five groups of subjects cited above would cover, in all, seven rounds of a year each out of the ten-year programme. The remaining three years out of a decade have been kept open for undertaking surveys on subjects unexplored so far as also to accommodate special requests from the Central and State Governments. Thus a system of phased collection of information on various items has already been adopted by the NSSO. The essential difference is that the ultimate sampling unit in the socio-economic surveys of the NSSO is the household. For agricultural purposes, what is needed is the operational unit of cultivator's holding. It is, however, possible to establish the relationship between the operational holdings and household holdings and collect the relevant information through the NSSO.

61.14.6 Reference has been made to the surveys with the live-stock holding as a unit in Section 8. We recommend that the various integrated surveys which we have referred to might continue to be carried out by the agencies responsible for the different subjects as at present. What is, however, needed is that there should be adequate arrangements for technical coordination and guidance. We suggest that the Governing Council of the NSSO should examine this question further.

61.14.7 Thus, the tendency to organise a fresh survey whenever any information on a new item is required should be discouraged. Hereafter, there should be the annual crop surveys/livestock surveys/fisheries surveys which should provide all the related information

required at yearly intervals. Other information required at periodical intervals should be fitted into the quinquennial agricultural censuses or sample surveys/livestock census/fishery census or into the cost of production enquiries. These could be ultimately developed into a system of National Agricultural Surveys. Information on any other items not covered by these surveys should be collected through the National Sample Surveys whenever possible.

15 RESEARCH STATISTICS

61.15.1 Till recently, research work in agricultural was handicapped by the absence of a unified record of experimental data in the country to serve as a reference and guide for future experimentation. IARS has filled up this gap by preparing the National Index of Field Experiments which is a collection of all relevant details of several thousands of scientifically planned and conducted agricultural experiments in the State and Central institutes. The index contains a wealth of information for the research and development workers in the country and helps them in planning their future programme. The data collected under the project are also being made use of to undertake research studies of agricultural and statistical interest. For example, studies on the effect of irrigation on crop yields and its interaction with other factors such as fertilisers, varieties, cultural practices, are in progress.

61.15.2 As already referred to earlier, to meet the needs of the data for planning etc., the IARS has developed appropriate statistical methodology for estimation of yield of various crops including condiments and spices and fruit crops. The feasibility of employing sample survey techniques in the fields of animal husbandry and marine fisheries has also been successfully demonstrated for adoption on regular basis by the States. Efforts should be made to evolve suitable techniques for estimation of area and production of vegetables and fodder crops also.

61.15.3 With the introduction of high yielding varieties during recent years, an acute need was felt for an objective assessment and evaluation of the programme. IARS initiated sample surveys for assessment of HYV programme in 1968-69 with the objective of collecting reliable data on the extent of cultivation of high yielding varieties, the yield rates of these varieties and comparable estimates of local varieties and extent of adoption of improved agricultural practices recommended for high yielding varieties in these districts. The

coverage of the surveys was extended to 88 districts spread over 15 States by 1971-72. The results of these surveys have thrown light not only on the actual achievement under the High Yielding Varieties Programme but also provided a sound and realistic basis for agricultural planning, policy formulation and target setting at the State and national levels. The scope of these surveys, however, needs to be extended to provide information on the local factors and problems contributing to low or high yields in different regions to serve as the basis for accelerating the pace of agricultural development.

61.15.4 The results of agricultural experiments conducted at various research and experimental stations may not be strictly applicable to farmers' fields. Experimentation on cultivators' fields, therefore, is necessary before making recommendations for adoption. Such experiments have to be representative of the range of cultivators conditions, fairly simple and scientifically rigorous so that valid scientific data become available for making recommendations. IARS has developed suitable designs for such experiments and at present these experiments are being adopted on a large scale all over the country.

61.15.5 Cost of production studies in agriculture present special difficulties as production is largely in the hands of small and illiterate cultivators who do not keep any accounts. IARS has developed suitable statistical techniques for carrying out large scale studies for estimation of cost of production of principal crops and livestock products. Efforts should be made to evolve suitable techniques for estimation of cost of production of important fruits and vegetables also.

61.15.6 In the field of animal sciences, IARS has collected and analysed large bodies of data pertaining to breeding of cattle, buffaloes, sheep and goats. These studies have provided useful information on the inherited economic characteristics which form the basis for preparing efficient breeding plans for the future. The Institute has also been helping research workers with suitable experimental sampling plans and appropriate techniques of analysis of data.

61.15.7 During recent years the demand for fertilisers has been gradually increasing. However, as a result of the recent fuel crisis, serious shortages in supply of fertilisers are being experienced not only in India but in the developed countries in the western world. In this context an important field which needs to be attended to relates to the optimum use of fertilisers in relation to crop production. The work regarding determination of optimum dosages of fertilisers for different crops in different regions already being done by IARS needs to be expanded.

61.15.8 Consequent upon the^a increasing tempo of agricultural and animal husbandry research, new types of statistical problems are being thrown up. To tackle the various research problems, to coordinate and supervise the programmes of statistical surveys and schemes sponsored by IARS in the various regions of the country and to expand the programmes for training in agricultural statistics, it is necessary that the Institute should be suitably strengthened.

16 DERIVED STATISTICS AND INDICATORS OF AGRICULTURAL ECONOMY

61.16.1 Several derived statistics and indicators of the agricultural economy are being currently worked out and published by the different Central and State Government Organisations with a view to meeting various requirements such as for studying the trends over time in respect of area, yield, production, productivity and prices etc., and that for studying the comparative performance of different regions in regard to their agricultural development.

61.16.2 The main derived statistics comprise the different agricultural index number series and growth rates, though a number of other derived statistics are also being made use of for various purposes in the field of agriculture. These index number series have been constructed after making due allowance for changes in the coverage and methods of estimation due to which the absolute figures of area, yield and production etc. are known to be unsuitable for study of trends over time. We have reviewed the current status of such derived statistics and indicators of the agricultural economy with a view to effecting improvements in their quality. This review has revealed that although a number of improvements have been introduced in regard to agricultural index numbers through implementation in part of the recommendations of the Technical Sub-Committee on Index Numbers set up by the Ministry of Agriculture and Irrigation under the chairmanship of Dr. V. G. Panse in 1965, there is still scope for further improvements. Likewise, although the available information in regard to some of the other derived statistics serves the present day needs, improvements need to be effected in the case of others.

61.16.3 Revised series of the all-India index numbers of area under crops, net area sown, cropping intensity, cropping pattern, crop yields, productivity per hectare and agricultural production with the triennium ending 1961-62 as base are being compiled and issued

by DES in the light of the recommendations of the Technical Committee. At the State level, index number series are being issued by the State Governments. Revised series on the lines of the all-India series have been compiled so far only by 5 States, viz., Haryana, Jammu & Kashmir, Punjab, Rajasthan and Tamil Nadu. To enable comparison of the performance of different States in the agricultural front, it is necessary to issue similar series for the remaining States. All-India and State series of index numbers should be published every year with the minimum possible time-lag.

61.16.4 The new series of index numbers of harvest (producers') prices, as recommended by the Technical Committee should be initiated as early as possible. Compilation of the revised series of index numbers of parity between prices received and prices paid by the farmer recommended by the Technical Committee, has been initiated only by 3 States (viz. Bihar, Haryana and Punjab). Bihar has, however, adopted a different base period than that recommended by the Technical Committee. The question in regard to change in the base period for Bihar and initiation of Statewise series in respect of States which have not yet started their compilation should be taken up and pursued with the concerned State Governments. All-India series should also be built up.

61.16.5 In order to provide ready basis for comparison of the productivity of different regions, index numbers of gross agricultural output per hectare and per agricultural worker for different crop regions of the country were issued only once viz. for the 3 year period ending 1958-59. These index numbers should be issued periodically say once every 5 years, in future.

61.16.6 In regard to growth rates in agriculture, Statewise and district-wise studies carried out by the DES covered the period upto 1964-65. These studies have, however, become out of date. Further, among these, the district-wise studies covered only a few States viz. Orissa, Punjab, Uttar Pradesh and Tamil Nadu. As such, periodical studies need to be undertaken in this regard covering all the districts/States at more frequent intervals.

61.16.7 Information regarding crop-wise input-output relationships in relation to size of holdings is needed by research workers, policy makers and administrators. The available data based on farm management surveys are out of date. A Comprehensive Scheme on the Cost of Production of Principal Crops has been sponsored by the DES. Technical coefficients should be worked out on the basis of these data and the results analysed to provide upto-date data on input-output relationships.

61.16.8 For preparation of commodity balance sheets, information is needed not only on the estimates of output as it leaves the farm but also in terms of the processed commodity and the by-products. Thus in the case of paddy, data are needed on the milling ratios to give separate estimates of output of rice and byproducts like husk and bran. In the case of sugarcane which is consumed in different forms, e.g., in the form of cane for chewing or juice, raw sugar, refined sugar and *khandsari*, separate estimates of output of these processed forms and cane utilised for each purpose are needed. The available information in this regard for oil-seeds, vegetable oils, sugarcane, cotton, jute, milk and other livestock products is mostly based on old surveys and as such has become out-dated. Fresh surveys, therefore, need to be conducted in a phased manner so as to make these data up-to-date.

61.16.9 While the estimates of national income including the contribution of agriculture to national income are published by the Central Statistical Organisation (CSO), there is need for compilation of National Accounts for Agriculture both by household and commodity disposition. Analysis of this type of data for the agricultural sector should be done by the DES in close collaboration with the CSO.

61.16.10 One of the basic difficulties in the introduction of the crop insurance schemes has been the absence of reliable data on variability in yields of different crops for smaller areas. Now that data on crop yields are available for a long period of time, these should be analysed periodically to provide a basis for fixation of insurance premia for different crops/regions.

61.16.11 We have also drawn attention to the statistics required for planning in Chapter 60 on Planning and those required for making demand projections in Chapter 10 on Demand Projections.

17 TABULATION, PUBLICATION AND DISSEMINATION

Computerisation

61.17.1 Most of the tabulation of regular official agricultural statistics at different levels is done manually or through simple calculating machines. At the Centre only data on prices, market arrivals and cost of production and growth rates, are analysed on the electronic computers. In view of the numerous advantages of computers and the proposal for setting up of computer centres and data

banks at the State and regional levels during the Fifth Plan period, the scope for use of computers in the collection, compilation and analysis of official agricultural statistics like land utilisation, irrigation, area and production of crops, price intelligence, animal husbandry statistics, fisheries statistics, etc., needs to be carefully examined. A beginning in this regard should be made by transferring the basic data for past years to magnetic tapes for depth studies, easy and timely retrieval and accuracy of tabulation. If found useful, this could be followed up to cover current data.

61.17.2 We have recommended in Section 18 the provision of simple calculating machines at the tehsil and district levels to improve the accuracy of tabulation and to expedite the compilation of data at different levels.

Publication and Dissemination

61.17.3 A number of organisations, both official and non-official, are at present engaged in the collection, compilation and analysis of data relating to various aspects of agriculture at different levels. These organisations are also periodically issuing a number of publications giving information on different items to meet the needs of policy makers, administrators and research workers. We have reviewed the current status of such publications with a view to examining their adequacy for present-day needs. This review revealed that although a number of improvements in the contents, coverage, timeliness, etc. of different publications have been effected during recent years, there is still scope and need for further improvements to serve the needs of various users. For example, information on a number of important items is not available. These gaps and the measures necessary to fill them up have been discussed in various sections. Another draw-back of these publications is that these generally become available with a considerable time-lag due to which their utility gets considerably impaired. This time-lag is partly due to delay in receipt of information from the basic sources and partly due to delay in bringing out such publications. They delay in bringing out such publications can be remedied by providing the departments concerned with printing facilities of their own or reserving a government printing press for such statistical work. In regard to the delay in receipt of information from the basic sources, it is necessary to impress upon the reporting authorities the need for timely submission of prescribed returns and periodically review the progress of reporting of such statistics at joint meetings of Central and State authorities to identify the bottlenecks and to suggest measures for removing

them. In the case of missing information on some items or certain States or districts, efforts should be made to release the data in the form it is available pointing out its limitations and making provision for subsequent revisions in such estimates as and when the relevant missing information becomes available.

61.17.4 To help research workers, to locate the desired information with facility, a bibliography of all printed or cyclostyled reports on different aspects of agriculture including those intended for limited official use should be brought out regularly by a Central agency.

61.17.5 Another draw-back that needs mention is that most of published data relate to past periods and information regarding outlook for the future is generally not available. Efforts should, therefore, be made to issue situation and outlook reports containing upto-date and authentic information on production prospects, prices, exports, etc. in respect of important agricultural commodities.

18 ORGANISATIONAL SET-UP FOR STATISTICS

61.18.1 Collection of agricultural statistics is beset with several difficulties in view of the fact that these relate to small units scattered all over the country and have to be collected within a limited period of time. Farmers being mostly illiterate, enquiry method cannot be relied upon and direct observation and physical measurement have to be resorted to for collecting reliable information. With the gradual increase in the requirements of data for policy, administration and planning, collection of agricultural statistics has become all the more difficult. For proper development of agricultural statistics on the lines recommended in the earlier sections, sound and comprehensive organisation is needed at different levels. Questions regarding the agency for collection of area statistics, strengthening of primary agencies for crop-cutting surveys, institution of central supervision over the work of area enumeration, strengthening of State and Central supervision over the conduct of cropcutting surveys, setting up of statistical units in State Irrigation Department's, organisational set-up for animal husbandry, forestry and fisheries statistics and strengthening of the wholetime technical reporting agencies for market intelligence have already been discussed in the relevant sections. The organisational set-up for agricultural statistics especially basic statistics of land utilisation, area and production, etc. at tehsil, district, State and Central levels is discussed below.

61.18.2 At the primary level, the Patwari has to continue to collect the basic agricultural statistics relating to land utilisation, area

under crops and irrigation based on complete enumeration of all fields. We have suggested the improvements necessary in this system in an earlier Section. But for a radical improvement in agricultural statistics, it is necessary to have a professionally competent, fully trained and unified statistical organisation from the level just above the Patwari and/or Kanungo right up to the State and Central levels. In many States, statistical staff at the district level dealing with agricultural statistics exclusively exist. In a few States, Taluk Statistical Assistants dealing mostly with agricultural statistics have been recently appointed. What is needed is that the statistical staff at different levels should be fully qualified and given adequate training and their services should be utilised exclusively for agricultural statistics.

Tehsil Level Staff

61.18.3 Tehsil is an important link in the flow of agricultural statistics. It is, therefore, necessary to ensure that the statistics flowing through that level are properly checked and scrutinised. At present, in most of the States there is no provision for technical staff to look after this type of work at the tehsil level. It is necessary to provide one Statistical Supervisor in each tehsil to supervise field work of different censuses and surveys to the extent of about 10 per cent, to scrutinise the basic returns like crop abstracts, etc., received from Patwaris, Revenue Inspectors, etc. to check village totals in the basic village forms or *Khasra* registers for at least one village per Patwari and to collect other development statistics on selected items. This Supervisor will work under the Tehsildar. To improve the accuracy of tabulation, one hand operated calculating machine should be provided for each tehsil. The firms manufacturing the calculating machines should be induced to set up maintenance centres at convenient locations.

District Level Staff

61.18.4 A statistical unit consisting of a District Agricultural Statistics Officer assisted by one Statistical Supervisor/Assistant and one Junior Clerk Computer should be provided at district level to supervise and coordinate agricultural statistics work at the district level. He will work under the Chief Agricultural Development Officer (CADO) proposed by us at the district level in Chapter 62 on Administration. He will help the district authorities in the compilation, scrutiny and analysis of agricultural statistics and submission of

returns to the State and Central Organisations. One hand operated calculating machine should be provided to ensure accuracy in the computational work done at the district level.

Set-up at State Headquarters

61.18.5 The set up for agricultural statistics at the State level differs from State to State. In most of the States, this work is handled by the Bureaus of Economics and Statistics, which deal with statistics in different sectors of the economy. In some States like Uttar Pradesh, Maharashtra, Madhya Pradesh, Punjab, Haryana and Gujarat, the work of agricultural statistics is handled by the Agricultural Statistician under the Director of Agricultural/Land Records. In view of the diversity of the administrative set up in different States no uniform pattern for agricultural statistics organisation at the State level can be laid down and it has to be left to the administrative convenience of the State Governments. However, it has to be ensured that an adequate organisation, irrespective of where it is located, should be built up at the State level to organise collection, compilation, analysis and processing of agricultural statistics according to a minimum programme and making available the final results to all concerned including the Central Government according to an agreed time schedule. The existing organisations at the State level should be suitably strengthened to enable them to effect necessary improvements in the data being collected at present and to organise collection of additional information on the lines recommended in different sections. The Head of the State agricultural statistics organisation should be a qualified statistician with adequate experience in any one or more fields of agricultural statistics viz., crop statistics, animal husbandry statistics, fisheries statistics and agricultural research statistics. He should be in an appropriate scale not less than Rs. 1,500—1,800. If this organisation forms part of the Bureau of Economics and Statistics, the officer in over-all charge of agricultural statistics should have the status of Additional Director of Statistics (Agriculture). The Agricultural Statistician though belonging to the cadre of the Bureau, should be administratively under the Agricultural Production Commissioner (APC) and be physically located in the same building so that the APC could have the benefit of the Statistician's advice and assistance in the day-to-day affairs. If the organisation is located in the State Agriculture/Land Records Department, the officer should have the rank of Additional/Joint Director of Agriculture/Land Records (Statistics). It should be the duty of this

officer to advise the APC, Secretary and Director of Agriculture and other concerned officers at the State level on all statistical matters relating to agriculture. He should be assisted by adequate number of Statisticians and Assistants Statisticians in appropriate scales and lower technical and ministerial staff. This organisation should also have a few qualified economists to take charge of economic investigations in the field of agriculture. The statistical organisations in the fields of agriculture, animal husbandry and fisheries in State where these are in the Bureau should belong to the general State Statistical Cadre, so that the career prospects of the statisticians working in separate units are not adversely affected. In States where these organisations are not in the Bureaus the statisticians in the fields of agricultural, animal husbandry and fisheries statistics should form a separate common cadre.

Set up at Central Level

61.18.6 At the Central level, the DES is mainly responsible for laying down uniform concepts and definitions, specifying minimum data needs, collection, compilation, analysis and publication of agricultural statistics. For this purpose the DES maintains close liaison with the State Governments and other Central organisations. For effective coordination and implementation of programmes for improvement of agricultural statistics, the Agricultural Intelligence Division of the DES needs to be strengthened. Separate units for handling work of outlook studies, timely reporting and improvements of crop statistics schemes, statistics of minor crops like fruits and vegetables and by-products of principal crops and index numbers relating to agricultural economy and growth rates should be set up. In order to ensure that the schemes for improvement of crop statistics are implemented effectively by the States and for providing them technical guidance as and when necessary the DES should have Regional staff at the appropriate technical levels in the different regions.

61.18.7 NSSO is at present in overall charge of technical guidance and supervision of crop-cutting surveys and for institution of central supervision over the work of area enumeration and sample check of crop cutting experiments under the new scheme for 'improvement of crop statistics' in 5,000 villages. NESSO should be suitably strengthened to attend to the above items and also to enable it to take up pilot and large scale sample surveys in other spheres such as livestock, fisheries, etc. If the sample size is required to be expanded further strengthening would be needed.

61.18.8 To tackle the various research problems emerging from the increasing tempo of agricultural and animal husbandry research, the IARS should also be suitably strengthened.

Training in Agricultural Statistics

61.18.9 We have drawn attention to the need for refresher training of the Patwaries and Kanungos in paragraph 61.2.9. There is need for periodic training of statistical staff employed in the State and Central organisations dealing with agricultural statistics. Suitable training courses should be developed and training organised in the IARS, ISI, FRI, DES and CSO. These organisations should be adequately strengthened to meet the increased demand for trained personnel in agricultural, animal husbandry, fisheries and forestry statistics.

61.18.10 It has been observed that, in the past, schemes for collection of basic data involving field visits by the primary and supervisory staff have suffered because of cuts in the budgetary provision for travelling allowances etc. It is recommended that in the case of statistical schemes funds should be provided separately and no cuts in the travelling allowance etc. should be applied after the scheme has been launched especially in the case of those concerning sample surveys, etc. involving periodical field visits by staff at various levels for collection of basic data.

19 AGRO ECONOMIC RESEARCH

61.19.1 The concern of Government policy in the field of agricultural development is not only to achieve a given rate of growth in farm production but also to bring about desired structural changes within that sector. Viewed in this light, a number of economic and social aspects like changes in the structure of ownership and operational holdings, shifts in occupations, pattern of employment and unemployment, trend in real wages, distribution of household incomes and relative rates of growth in income among different regions and categories of farmers—all become matters of close scrutiny and sustained investigation. Data to monitor such changes over time would, therefore, be very essential. More often than not such data emerge from specially designed economic investigations which reach out to micro-level units for information. No realistic and meaningful exercise in planning and policy formulation would be possible if such data are not available to supplement the macro-level data regularly brought out by a number of official organisations at the Centre and the States. A beginning, therefore, was made in 1950 to organise and undertake the type of research and investigations

that yielded the requisite information. As existing facilities for the purpose were extremely meagre, a number of new organisations had to be built up, majority of them with governmental assistance.

61.19.2 The main agencies engaged at present in agro-economic research are

- (i) agro economic research centres (AER) and farm management studies (FMs) centres financed by the Ministry of Agriculture and Irrigation;
- (ii) Indian Council of Agricultural Research, (ICAR);
- (iii) Indian Council of Social Science Research (ICSSR);
- (iv) agricultural and other universities; and
- (v) other institutions.

Studies sponsored by the Ministry of Agriculture and Irrigation

61.19.3 Two sets of institutions, one mainly for studying changes in the rural economy and the other solely for farm management investigations were sponsored by the Ministry of Agriculture and Irrigation in the beginning from 1954. The former are known as agro-economic research centres and the latter as centres for farm management studies. While A.E.R. centres have been set up on a regular and long-term basis, FMS centres are purely temporary and are generally wound up as and when the three-year investigations and subsequent reporting are completed.

61.19.4 In all, eleven AER centres have been set up so far in different agro-climatic regions and the whole country is divided suitably among them to carry out agro-economic investigations. These centres are located either at universities or research institutions devoted to economics, and are financed wholly by the Ministry of Agriculture and Irrigation. The main functions of these centres are:

- (i) to undertake village surveys and resurveys at suitable intervals of time with a view to studying changes that take place in the village economy and identifying the forces engendering such changes;
- (ii) to conduct investigations into specific problems and indicate possible lines of action; and
- (iii) to carry out problem-oriented studies with uniform designs and mutually agreed methodology and cross-section studies of different aspects of the village economy.

61.19.5 The AER centres have completed about 355 village-surveys and 86 repeat surveys. The reports on these surveys and repeat surveys contain a wealth of information and statistical data, not only on various aspects of the rural economy but also about the changes that are taking place in rural India and the factors influenc-

ing the changes. Besides, a number of very comprehensive problem oriented studies have been carried out by these centres on subjects like food control, procurement and distribution; working of fair price shops, pace and pattern of market arrivals of foodgrains; cooperative farming; economics of irrigation and water rates; evaluation of high-yielding varieties programme; loans from land mortgage banks; special employment programmes; and income, savings and investments in agriculturally progressive areas. The result of these studies have been useful in policy formulation exercises.

61.19.6 Simultaneously with the setting up of AER centres, the Ministry of Agriculture and Irrigation also sponsored a series of investigations into the economics of farm business in typical soil-climate-crop complexes in the country. Studies have so far been completed in 22 regions, and repeat studies in five of them. These have yielded very valuable data in respect of structure and organisation of farms, cost of cultivation of individual crops, utilisation of human and bullock labour, input-output relations in crop production, profitability of farming in general, and other aspects of the farm-enterprise. More recently, an all-India cost of production enquiry has been sponsored by the Ministry which is being carried out since 1970-71. Under this scheme detailed data are being collected on various inputs that go into production of crops and the resulting yields with a view to obtaining estimates of cost of cultivation and production of important crops. Such data are a pre-requisite to any review of price policies relating to farm products. Agricultural universities are involved in this programme in so far as field work for the enquiry is mainly their responsibility.

61.19.7 Besides, Department of Rural Development of the Ministry of Agriculture and Irrigation have sponsored some special studies for obtaining statistical data on conditions of employment, unemployment and under-employment in rural areas and ancillary information required in connection with the formulation of the crash programme on employment. The studies were carried out with the help of about 13 institutions and proved very useful.

61.19.8 An Economic Policy Cell has also been set up in the DES to examine and study important issues relevant to agricultural planning and policy on a regular and continuous basis and to advise the Ministry of Agriculture and Irrigation on various problems in the sphere of agricultural economics. The Cell is not expected to undertake any field surveys on its own, but work on the basis of secondary data available from other sources. The Research Division in the DES coordinates the work of AER centres and FMS

centres while the cost of production enquiries are coordinated in a separate unit.

Projects Sponsored by the ICAR

61.19.9 The ICAR, through one of its specially constituted Committees (now called the Scientific Panel on Agricultural Economics and Marketing) has been sanctioning time to time schemes having a bearing on agro-economic aspects of the rural economy. Financial grants are provided by the Council for undertaking such studies which are generally carried out on *ad-hoc* basis, for a limited period of time. A large number of studies covering different facets of the rural economy have been supported by the ICAR since its inception.

61.19.10 The IARS a constituent of the ICAR, is also involved in agro-economic research to a limited extent through their methodological investigations, pilot project experimentation as also field investigations and supervision as in the case of evaluation of the Intensive Agricultural District Programme.

Studies sponsored by Planning Commission and ICSSR

61.19.11 The Planning Commission had set up a Research Programme Committee (RPC) in 1953 which actively encouraged research in agro-economic problems in universities and research institutions of repute. It sponsored nearly 300 studies on various subjects relating to agriculture and related sectors of the economy. The Indian Council of Social Sciences Research (ICSSR), set up in 1969 in the Ministry of Education and Social Welfare, took over most of the functions of the RPC and has been promoting research in social sciences since then. The Council has set up, jointly with the ICAR, a Joint Scientific Panel for Social Sciences and Agricultural Economics in March, 1974. The main functions assigned to the Panel are to study the social infrastructure needed for rapid spread of new agricultural technology, to review periodically research work on social aspects of agricultural technology and to suggest measures for coordination of activities. The Panel is also expected to suggest coordinated programmes of research and model schemes in the disciplines assigned to it and to lay down priorities for research. The Planning Commission continues to sponsor socio-economic research on problems having a direct bearing on plan formulation and implementation. For instance prior to

launching the Small Farmers' Development Agency and the Programme for Marginal Farmers and Agricultural Labourers, the Commission sponsored *ad-hoc* enquiries into the problems of these vulnerable sections through universities, research institutes and individual research workers which yielded bench mark indications and guidelines for policy.

Agricultural and other Universities

61.19.12 Agricultural economics sections of the agricultural universities generally undertake research work and carry out agro-economic surveys and studies in areas within their jurisdiction. Most of these universities are involved in the cost of production enquiry sponsored by the Ministry of Agriculture and Irrigation. Some general universities also take up studies in the departments of economics and applied economics.

Other Institutions

61.19.13 Besides the agencies mentioned above, there are good number of institutions devoted to agro-economic research. These include the following:

- (i) Gokhale Institute of Politics & Economics, Poona;
- (ii) Institute of Economic Growth, Delhi;
- (iii) Institute of Social and Economic Change, Bangalore;
- (iv) Centre for Development Studies, Trivandrum;
- (v) Indian Society of Agricultural Economics, Bombay;
- (vi) National Council for Applied Economic Research, New Delhi;
- (vii) National Productivity Council, New Delhi;
- (viii) Administrative Staff College, Hyderabad;
- (ix) Indian Institutes of Management located at Ahmedabad, Calcutta and Bangalore;
- (x) Shri Ram Centre for Industrial Relations and Human Resources, New Delhi; and
- (xi) Institute of Techno-Economic Studies, Madras.

These institutions undertake research on problems relating to agricultural economics on their own and on request by Central or State Governments. Very often financial assistance is extended to them by the Government.

61.19.14 Certain international organisations have also recently shown interest in research in specific agro-economic problems. A global study on the social and economic implications of large scale introduction of new varieties of foodgrains sponsored by the United

Nations Development Programme (UNDP) and another study on the impact of tractorisation on employment sponsored by the World Bank were undertaken in selected areas in the country. A study of the impact of improvements in rice farming, sponsored by the International Rice Research Institute in selected regions has also been carried out.

61.19.15 During the last two decades a good deal of research and data collection had been done in the field of agricultural economics by the above mentioned organisations. Even so there remain significant gaps in information and knowledge. There is also much to be desired about the way the work is organised in various institutions. The practice so far has been that whenever information is required, *ad-hoc* studies, mostly diagnostic, are sanctioned for different centres for limited periods without any attempt at organising them into a coordinated programme of research. Among the few exceptions are the farm management and cost of production studies. An obvious draw-back of this approach has been that very often no uniformity could be ensured in respect of concepts and definitions adopted by different institutions and hence in the information collected. Neither could there be continuity in the flow of information as the projects were temporary. In the case of some schemes, particularly farm management studies, technical staff recruited and trained at considerable cost had to be disbanded which invariably resulted in wastage of trained manpower. It has also to be kept in mind that experienced research workers are not many and finances available for the purpose are rather limited. All these clearly point to the need for placing agro-economic research on a sound footing and for greater coordination of the work of various agencies involved so that information of interest to Government is obtained at short notice, almost on tap.

61.19.16 The first step in such a systematisation and rationalisation is to indicate the priority areas of research in the field of agricultural economics. We note that a sub-committee set up by the former Scientific Panel on Agricultural Economics, Statistics and Marketing of the ICAR had looked into this question and gave suggestions regarding the priority areas for research. The list drawn up by that committee, however, appears to be too long. Taking into account the immediate needs of agricultural planning, we feel that the priority areas for concentration of future efforts should be as follows:

- (i) Problems of small and marginal farmers and agricultural labourers—including evaluation of SFDA and MFAL

- programmes and assessment of their impact on the weaker sections of society.
- (ii) Agricultural labour, employment unemployment and wages.
 - (iii) Problems of special regions, including those of drought-prone areas hill areas and tribal areas.
 - (iv) Analysis of regional disparities in agricultural growth, including a probe into the backward monsoon agriculture of eastern States.
 - (v) Pattern of income distribution, savings and investment in rural areas, particularly those benefited by intensive agricultural programmes.
 - (vi) Economics of dry land farming, multiple cropping and improved agricultural practices like fertilisers, new seeds, pesticides, etc.
 - (vii) Economics of improved water use and water management practices in irrigation project.
 - (viii) Impact of mechanisation on employment, agricultural productivity and income.
 - (ix) Economics of livestock, poultry keeping, dairying and fisheries.
 - (x) Economic aspects of storage and marketing of agricultural produce.
 - (xi) Change in consumption pattern and standard of living of different classes in rural areas.
 - (xii) Cost-benefit analysis of different development projects in the field of agriculture.
 - (xiii) Integrated area development.
 - (xiv) Role and impact of economic incentives for agricultural development.
 - (xv) Capital formation in agriculture.

61.19.17 The next step is to indicate the general pattern of organisational arrangements considered suitable for research and investigation. The type of studies indicated above may be divided into two broad categories, viz., (a) those which need collection of information from micro-level units; and (b) those based on secondary data. While institutions having field level staff like the AER centres, the agricultural economic sections of the agricultural universities and similar specialised agencies can be entrusted with the first type of studies, studies based on secondary data could more appropriately be done at post-graduate centres of research like the Institute of Economic Growth, the Centre for Development Studies, the Institute of Social and Economic Change etc.

61.19.18 It may also be worthwhile exploring the possibility of involving post-graduate students of the agricultural universities in the process of economic investigation, data collection and analysis both for training them and for providing useful data. If organised efficiently and systematically, this type of involvement of students can open up a potential source of agro-economic data at micro level. One way of doing this is to make some investigational work in the field of agricultural economics an integral part of the curriculum prescribed for M.Sc. students in agricultural economics, applied statistics etc. The students could undertake this work during summer vacation either in their own villages if coming from rural areas or in nearby villages if they belong to urban areas. Studies based on such investigations by their very nature, will be quick and purposive and the cost element comparatively lower. The teaching staff supervising research work of students also stand to gain as these studies would bring them in closer contact with field problems, thus widening their knowledge and experience. Teaching itself would become more realistic and meaningful in the process instead of being merely bookish. The subjects for these studies might be determined by the coordination committee referred to in paragraph 61.19.23 which might indicate in advance to the agricultural universities the items on which information would need to be collected. It would, however, be necessary to provide some financial assistance to students undertaking these investigations for meeting such expenses as on printing of forms, travel, etc.

61.19.19 The work relating to continuous village surveys and farm management investigations, no doubt, constitutes the bulk of research activity in the area of agricultural economics during the post-Independence period and hence demands a closer look. We note with a measure of disappointment that though a large number of single point village surveys and repeat studies have been completed by the AER centres at considerable cost, no serious effort has been made to use them in any systematic analysis of the growth and development process of the Indian economy. The disappointment is all the more because the village studies, focussed as they were on some well-identified forces of change, were primarily intended to throw light on the development process. In spite of this unique aspect about them they have remained largely unexploited. Broadly, the group of villages studied could be considered as fairly typical of rural India as they were selected not only to represent typical agro-climatic regions but also different stages of agricultural progress. In point of fact, every village could be considered as typifying a particular stage of economic development in the time-path of growth. Viewed

from this angle, the 350 and odd villages studied constitute a cross section of the Indian rural economy representing all types of villages, progressive, stagnant, backward and regressive. Based on these enquiries it should be possible to attempt comprehensive studies of the development process seeking mainly to identify the more potent among various forces of change and the more favourable combinations of situations that respond readily to external stimuli and to formulate the course and stages of economic growth and development in the Indian context. Incidentally, such studies would also provide opportunities for comparing the actual trends observed in the rural economy with known formulations of the growth process by theorists. It would be expedient to initiate such studies on an area or State basis at the first stage as studies on an area undertaken by a particular centre have greater uniformity; then on a regional basis based on studies made by more than one Centre and finally at the all-India level.

61.19.20 At this area of agro-economic research has not attracted many researchers it would be necessary to take some promotional steps. We suggest that a few research scholarships or fellowships may be arranged with specialised institutions like the Institute of Economic Growth and Gokhale Institute of Politics and Economics having some links with agro-economic research centres and at the same time providing facilities for advanced research in humanities, particularly agricultural economics, leading to Ph. D. The ICSSR could also be involved in this programme as they too disburse scholarships and fellowships for work in approved areas of research. The technical personnel belonging to specialised services like the Indian Economic Service and the Indian Statistical Service who are desirous of developing research experience and expertise in agricultural economics, village studies as also farm management investigations offer a challenging area for research. However, essential facilities would need to be created in advance so that the willing could come forward without reservation. We recommend that the cadre authority administering these two Services, in consultation with the Ministry of Agriculture and Irrigation should select eligible and competent candidates, sponsor them to collaborating universities for admission and registration for research and allow them sufficient leave, i.e., 2 to 3 years, to complete the work. Performance of officers involved in this programme and progress of their work could be watched by the Coordination Committee referred to in paragraph 61.19.23.

61.19.21 The farm management studies undertaken so far have provided comprehensive data for 22 typical agro-climatic crop regions

in the country. These studies have not only filled many gaps in the data-base but have also proved very helpful in gaining a clear understanding of the structure and functioning of the farm economy. The availability of reliable and detailed farm level data on a number of basic aspects of the rural economy have facilitated deeper probe by researchers into inter-relationships involving various factors of production which have resulted in some significant contributions to Indian agricultural economics. It is, therefore, very important that those studies are continued and carried further in a phased manner so as to cover all typical agro-climatic regions in the country in course of time. We, however, observe that with the launching of All India cost of production enquiry there is a tendency to play down the importance of farm management studies and slow down its implementation. We would like to emphasise that cost of production studies are no substitute for farm management investigations and the latter should be continued with greater vigour.

Research Coordination

61.19.22 Adequate arrangements did not exist for a long time for coordinating the work of various agencies engaged in agro-economic research. The Research Division in the DES attempted some coordination but the effort was confined to schemes sponsored by the Ministry, viz., agro-economic research studies, farm management studies and cost of production enquiries. There was a Co-ordination Committee for agro-economic research centres, but both in nature and scope, its role was too limited. With the coming into being of agricultural universities, each of which has an agricultural economic section and the institutions referred to in paragraph 61.19.13, the need for coordination of the agro-economic research has increased. The situation had been leading to overlap in efforts in certain areas while major gaps in information continued to persist. The status of agro-economic research in the country was recently reviewed and it was decided to set up a suitable agency for coordination of agro-economic research.

61.19.23 Accordingly, the existing Coordination Committee for agro-economic research centres was reconstituted into the Coordination Committee for Organisation of Micro-Economic Studies in the field of agricultural economics in May, 1975 under the Chairmanship of Secretary, Department of Agricultural Research and Education. Secretary, Department of Agriculture is a Member. Besides, there are 21 members on the Committee drawn from various divisions of the Ministry of Agriculture and Irrigation, and organisations like the

AER centres, IARS, the Programme Evaluation Organisation and the NSSO. Other bodies represented on the Committee are the Reserve Bank of India, the agricultural universities, agricultural colleges, general universities and research institutions. The terms of reference of this Committee are:

- (i) to visualise the problems in the field of agricultural economics on which data are needed in the immediate short-run and also in the long-run, and to determine priorities for research;
- (ii) to examine the broad organisational arrangements necessary for collecting the requisite information, repending upon whether the data need to be collected from the field or the analysis can be based on secondary data already available and to decide upon the institutions that may be entrusted with the studies;
- (iii) to determine the subject coverage for the studies that may be taken up every year by the students of the M.Sc. Course in agricultural economics and to indicate in advance to the agricultural universities the items on which information may be collected; and
- (iv) to make periodical assessment of the work done and make suggestions for further improvement.

61.19.24 The Coordination Committee will be a standing committee. It has also been decided that the Research Division of DES will service the Coordination Committee in the matter of providing technical and secretariat assistance and taking follow up action on the Committee's recommendation.

61.19.25 We feel that while the setting up of the Coordination Committee has been in the right direction, institutions all important independently engaged in agro-economic research, should be represented on it without making it unduly large. State Bureaus of Economics and Statistics which have a regular programme of agro-economic research could also be represented on the Committee. The terms of reference given to the Coordination Committee may be modified to bring under its scope the scholarship schemes suggested in para 61.19.20. Financing of the projects may be done as before, either by the Ministry of Agriculture and Irrigation if the schemes are to be undertaken by AER centres or by the ICAR in respect of schemes to be undertaken through agricultural universities and other institutions. The ICSSR could also sanction schemes which have a bearing on agricultural economics. There should, however, be a clear cut demarcation of the type of studies which are to be financed by the Ministry, the ICAR and the ICSSR.

61.19.26 The Research Division of the DES would need some strengthening in view of the expansion of work and the additional responsibility it is expected to undertake. The Economic Policy Cell of the DES also needs to be strengthened to enable it to provide the leadership in organising micro-economic studies and preparing reports of integrated studies relevant for agricultural planning.

20 SUMMARY OF RECOMMENDATIONS

61.20.1 Important recommendations for the improvement of agricultural statistics made in this chapter are indicated below:

1. The coverage of land utilization and crop statistics should be extended to the entire geographical area of the country by 1978-79 at the latest. Ad-hoc estimates of land utilization should be prepared in respect of the non-reporting areas on the basis of aerial photographs, broad topographical survey and other available information.

(Paragraph 61.2.1.)

2. The Patwari agency should continue to be responsible for collection of basic agricultural statistics. The jurisdiction of the patwari should be reduced whenever it is excessive. Intensive supervision through normal revenue and statistical staff should be organised over his work of area enumeration.

(Paragraph 61.2.7)

3. The method of complete enumeration for collection of basic agricultural statistics should be introduced in the States of West Bengal, Orissa and Kerala in a phased manner.

(Paragraph 61.2.8.)

4. Refresher training should be imparted to the Patwari and the Kanungos in the methods of collection of agricultural statistics, at periodic intervals.

(Paragraph 61.2.9)

5. The States should adopt the revised basic and abstract land record forms and concepts and definitions and the procedures for recording of area under mixed crops recommended by the Committee on Improvement of Agricultural Statistics.

(Paragraphs 61.2.10 and 61.5.10)

6. Crops like soyabean and sunflower which have been introduced in recent years should be included within the scope of crop estimation system.

(Paragraph 61.3.1)

7. The sampling design for crop-cutting surveys should be reviewed with a view to introducing stratification according to irrigated and rainfed areas and according to high yielding and local varieties of crops.

(Paragraph 61.3.5)

8. The Timely Reporting Scheme, which is in operation in 17 States, should be extended to the remaining States by 1976-77. The Directorate of Economics and Statistics (DES) should try to ensure the quality of the field and supervisory work done in the States under the scheme.

(Paragraphs 61.5.4 and 61.5.5)

9. Each State should review the sowing and harvesting seasons of different crops, at the district level, and revise the period of crop inspection where necessary so that all crops including, late sown summer crops are covered.

(Paragraph 61.5.11)

10. Steps should be taken to reconcile the variations between the different sets of estimates for crops like cotton, tobacco, pepper, cashewnuts, etc. issued by different agencies.

(Paragraph 61.5.12)

11. The DES should prepare qualitative reports on crop and weather conditions on the basis of reports from Block Agricultural Development Officers at the block level and Chief Agricultural Development Officers at the district level, which could be later developed into advance estimates of crop production.

(Paragraph 61.5.13)

12. The scope of the pilot investigations being carried out by the IARS for developing advance estimates of crop production on the basis of biometric measurements of the crop during its growth should be extended to other crops and the results utilised on a field scale as soon as the requisite techniques are evolved.

(Paragraph 61.5.14)

13. The Committee on Improvement of Agricultural Statistics (CIAS) should be activated to consider new proposals for improvement of agricultural statistics and to review from time to time the action taken on its recommendations. The scope of the Committee should be widened to cover livestock, fisheries and forestry statistics also.

(Paragraph 61.5.15)

14. At the present stage of development of remote sensing techniques, their use in crop estimation has certain limitations. The

DES should however keep in touch with the developments in the field.

(Paragraph 61.5.17)

15. Situation and outlook reports covering area, production, prices, market arrivals, internal and external trade, stocks etc. should be prepared and issued in respect of principal crops.

(Paragraph 61.5.18)

16. Adequate arrangements should be made in each State for collection of statistics of area under important fruits and vegetables.

(Paragraph 61.6.4)

17. A census of fruit trees should be conducted once every five years.

(Paragraph 61.6.5)

18. Sample surveys for estimating the yield rates and production of fruits should be conducted for one or two crops every year in rotation in accordance with an all-India programme. For vegetables, pilot investigations should be conducted by the States and IARS in important growing areas.

(Paragraph 61.6.6)

19. To collect the data on prices and arrivals of fruits and vegetables, full time staff should be provided in all the important city fruit markets.

(Paragraph 61.6.7)

20. Methodological investigations should be carried out to standardise the data collection techniques for estimating cost of cultivation of fruits.

(Paragraph 61.6.8)

21. Statistical units should be created in the State Horticulture Departments or agricultural statistics sections to look after the work of horticultural statistics. A separate cell may be created in DES to coordinate the data collected by the States.

(Paragraph 61.6.10)

22. Standard concept and definitions of terms used in irrigation statistics should be adopted uniformly. Reconciliation of the figures reported in LUS and Irrigation Progress Reports should be done by the planning unit at the district level.

(Paragraphs 61.7.6 and 61.7.9)

23. Source-wise classification of irrigated area should be amplified to give separate figures for major, medium and minor sources and from surface and ground water sources.

(Paragraph 61.7.10)

24. A census of irrigation sources should be undertaken along with the Agricultural Census once in five years. Special irrigation surveys on the number of wells and their utilisation may be undertaken by other States.

(Paragraphs 61.7.13 and 61.7.14)

25. Annual administration reports of State Irrigation Departments should be published every year together with comprehensive statistical data in standard proformas. These data should be consolidated at all-India level and published annually.

(Paragraph 61.7.17)

26. Statistical units should be provided in the State Irrigation Departments for collection and analysis of irrigation statistics.

(Paragraph 61.7.19)

27. Livestock census should be undertaken simultaneously in all States and Union Territories. While the complete enumeration census may be confined to the broad classification of cattle and other livestock and poultry, details regarding breeds, sex, etc. should be obtained through sample surveys. The practice of having a post-enumeration check by an independent agency should be revived.

(Paragraph 61.8.5)

28. Advance reports on the livestock census results should be brought out within a few months of its completion on the basis of advance tabulations on sampling basis.

(Paragraph 61.8.6)

29. The methodology of integrated surveys for obtaining estimates of output of livestock products and numbers spread over a period of five years should be finalised quickly. Till then, sample surveys for estimation of production of milk and other livestock products should be conducted on a priority basis. A system of periodical release of all-India and State estimates of livestock products should be introduced.

(Paragraph 61.8.10)

30. Weekly wholesale and retail prices of livestock, livestock products, livestock fed and fodder, market arrivals of major livestock products and monthly production of livestock feed should be collected regularly.

(Paragraph 61.8.11)

31. The Directorate of Marketing and Inspection should carry out fresh surveys to collect upto-date information on marketing of major livestock products and proportions of these products converted into various indigenous products such as butter, ghee, cheese, etc.

(Paragraph 61.8.11)

32. Standard proformas for collection of information on various items in respect of dairy plants, slaughter houses, bacon factories, poultry dressing plants, feed manufacturing plants, bone digesters, etc. should be prescribed.

(Paragraph 61.8.13)

33. Quarterly district livestock situation reports containing information relating to season, incidence of disease, availability of animal feed and fodder, etc. should be developed.

(Paragraph 61.8.15)

34. The District Animal Husbandry Officer should have the help of requisite computational and other staff, to help him in the collection, compilation and submission of various types of livestock statistics. At the State level, the Director of Animal Husbandry should have a full fledged Statistical Division for collection, compilation, analysis and dissemination of all animal husbandry statistics. This Division should be under the charge of a fairly senior statistician not below the rank of Joint Director of Animal Husbandry. An economist of a suitable rank should also be provided in this Division for economic analysis of various projects and undertaking evaluation studies.

(Paragraph 61.8.17)

35. The major dairy plants should have an economist on their staff to render advice on economic problems.

(Paragraph 61.8.17)

36. At the Central level, the Statistical unit in the Animal Husbandry Division of the Ministry of Agriculture and Irrigation should be considerably strengthened. An economist should also be provided in this unit.

(Paragraph 61.8.18)

37. The IARS should continue to handle methodological research and pilot investigations in the sphere of livestock statistics. Similar methodological studies should also be taken up by agricultural universities with financial assistance from the Centre.

(Paragraph 61.8.20)

38. An integrated survey should be designed to enable all-India and statewise estimates of marine fish catches to be obtained with a reasonable degree of precision.

(Paragraph 61.9.3)

39. Appropriate methodology for estimation of inland fish production including catches from captive fishery resources should be made available to the State Governments for implementation.

(Paragraph 61.9.4)

40. Data on fishermen population, fishing crafts and tackle; inland water resources, biological and research statistics, prices, etc. should be collected regularly.

(Paragraph 61.9.5)

41. Census of fishing craft, tackle and nets should be conducted independently of the livestock census by the State Fisheries Departments under the overall technical control and guidance of the Fisheries Division of the Central Ministry of Agriculture and Irrigation.

(Paragraph 61.9.6)

42. Inland fisheries resources should be surveyed periodically specially with reference to geographical, physical, chemical and biological factors and classified accordingly.

(Paragraph 61.9.7)

43. A continuous survey of marine fisheries resources should be undertaken to collect information on various biological characteristics such as growth, recruitment, mortality etc.

(Paragraph 61.9.8)

44. Registration of small mechanised boats below 25 GRT should be introduced to enable maintenance of upto date statistics of number of such boats in operation as also to keep a watch on the growth of mechanisation of boats.

(Paragraph 61.9.9)

45. In the case of larger vessels above 25 GRT data regarding operational details and performance should be collected and analysed systematically.

(Paragraphs 61.9.9 and 61.9.10)

46. State Departments of Fisheries should collect reliable estimates of seed fish on a regular basis.

(Paragraph 61.9.11)

47. Data on producers' wholesale and retail prices for standard varieties and predetermined specifications and other market intelligence in regard to fish should be collected.

(Paragraph 61.9.12)

48. Every State should have a strong statistical units in the Fisheries Department to deal with all aspects of fisheries statistics. At the Central level, the Fisheries Statistics Unit in the Fisheries Division should be strengthened. An economist should also be added to this unit at the Central and State levels.

(Paragraph 61.9.17)

49. The Statistical Units in the Central fisheries institutes like the Central Marine Fisheries Research Institute, Central Inland Fisheries Research Institute and Central Institute of Fisheries Technology should be strengthened. For the work of economic

evaluation etc., the assistance of an economist should also be provided to these institutes.

(Paragraph 61.9.18)

50. Efforts should be made to reconcile the differences in the two sets of forest area figures available from Land Utilization Statistics and Indian Forest Statistics. The States should adopt modern classification in the collection of forestry statistics according to functional classification.

(Paragraph 61.10.4)

51. Suitable procedures should be devised to frame estimates of unrecorded production through sample surveys or otherwise at least once in five years. The possibility of collecting data on timber and fuelwood from agricultural lands through the periodical agricultural censuses should be examined.

(Paragraph 61.10.7)

52. There is need for verifying the reported figures of output of forest produce in respect of coupes auctioned in standing position, through sample checks.

(Paragraph 61.10.8)

53. The concept of value of outturn of forest produce should be clearly defined and should relate to the value at the first point of sale by the Forest Departments.

(Paragraph 61.10.8)

54. Wholesale prices of major and minor forest products should be collected regularly at fortnightly or monthly intervals and should be included in the scope of index numbers of wholesale prices.

(Paragraph 61.10.9)

55. Careful analysis of costs of various operations from the stage of plantations to the actual marketing of timber on the basis of economic concepts and usual principles of costing is necessary.

(Paragraph 61.10.10)

56. Regular data on various aspects of labour employed in forestry should be collected according to uniform concepts and definitions.

(Paragraph 61.10.11)

57. A whole-time Forester (Statistics) should be provided in each range for collection and compilation of forestry statistics. At the divisional level, the Divisional Forest Officer should be assisted by a Range Forest Officer (Statistics) and a Junior Statistical Assistant for statistical work. At the circle level, the statistical unit should consist of a Class II Statistical Officer assisted by requisite complement of Statistical Assistants and Clerks. At the State Headquarters, the Chief Conservator of Forests should be assisted

by a Director of Forest Statistics. He should be assisted by requisite number of statisticians.

(Paragraphs 61.10.13 and 61.10.14)

58. At the Centre, the existing Statistical Unit in the Central Forestry Commission should be developed into a full-fledged Statistical Division and in charge of a Statistician in an appropriate scale.

(Paragraph 61.10.14)

59. Data on consumption of fertilisers by crops and by size classes of holdings, etc. should be collected through the Comprehensive Scheme for Cost Cultivation of Crops or through special surveys.

(Paragraph 61.11.1)

60. Data on seed production and distribution and seed rates of different crops/varieties should be collected and compiled regularly.

(Paragraph 61.11.2)

61. Data on quantities of pesticides produced, distributed and applied to different crops should be collected systematically.

(Paragraph 61.11.3)

62. Scope and coverage of foreign market intelligence should be reviewed in consultation with the Ministry of Commerce and adequate arrangements should be made for their systematic collection.

(Paragraph 61.12.5)

63. The Agricultural Census with 1976-77 as the reference period should be carried out as proposed by the Ministry of Agriculture and Irrigation. The results should be made available by the end of 1978 at the latest.

(Paragraph 61.13.2)

64. For meeting the minimum data needs in the sphere of agriculture, an integrated system of agricultural surveys, covering both the current agricultural surveys and the periodical agricultural and livestock censuses should be devised. Various integrated surveys should continue to be carried out by the agencies responsible for the different subjects as at present. There should, however, be adequate arrangements for technical coordination and guidance. The Governing Council of the NSSO should examine this question further.

(Paragraphs 61.14.1 to 61.14.6)

65. The scope of the assessment surveys on High Yielding Varieties Programme being conducted by the IARS should be extended to provide information on the local factors and problems contributing to low or high yields in different regions to serve as the basis for accelerating the pace of agricultural development.

(Paragraph 61.15.3)

66. The work regarding the determination of optimum dosages for fertilisers for different crops in different regions already being done by the IARS should be expanded.

(Paragraph 61.15.7)

67. The IARS should be suitably strengthened to tackle the various research problems, to coordinate and supervise the programmes of statistical surveys and to expand the programmes of training in agricultural statistics.

(Paragraph 61.15.8)

68. Revised series of all-India index numbers of area under crops, net area sown, crop yields, agricultural production, etc. should be issued for all the States. The all-India and State series of these index numbers should be published every year with the minimum possible time-lag.

(Paragraph 61.16.3)

69. The new series of index numbers of harvest (Producers) prices as recommended by the Technical Committee on Index Numbers should be initiated as early as possible.

(Paragraph 61.16.4)

70. The compilation of the revised series on index numbers of parity between prices received and prices paid by the farmer should be taken up by all the States.

(Paragraph 61.16.4)

71. Statewise and districtwise studies on growth rates in agriculture should be undertaken at more frequent intervals.

(Paragraph 61.16.6)

72. Technical coefficients for input-output relationships should be worked out on the basis of the data collected during the comprehensive scheme on cost of production of principal crops.

(Paragraph 61.16.7)

73. The scope for use of computers in the collection, compilation and analysis of agricultural statistics needs to be carefully examined. A beginning in this regard should be made by transferring the basic data for past years to magnetic tapes for depth studies, easy and timely retrieval and accuracy of tabulation. If found useful, this could be followed up to cover current data also.

(Paragraph 61.17.1)

74. To reduce the time-lag in the availability of agricultural statistics the concerned departments should be provided with printing facilities of their own or a Government printing press should be reserved for the purpose.

(Paragraph 61.17.3)

75. A bibliography of all printed and cyclostyled reports on different aspects of agriculture including those intended for limited official use should be brought out regularly by a Central agency.

(Paragraph 61.17.4)

76. One Statistical Supervisor should be provided in each tehsil to supervise the field work of different censuses and surveys, etc. This supervisor should work under the Tehsildar. To improve the accuracy of tabulation, one hand operated calculating machine should be provided for each tehsil.

(Paragraph 61.18.3)

77. A statistical unit consisting of a District Agricultural Statistics Officers assisted by one Statistical Supervisor/Assistant and one Junior Clerk/Computer should be provided at the district level. He should work under the proposed Chief Agricultural Development Officers at the district level. One hand operated calculating machine should be provided to this Unit.

(Paragraph 61.18.4)

78. At the State level, the existing organisation for agricultural statistics should be strengthened. The Head of the State Agricultural Statistics Organisation should be a qualified statistician with adequate experience, in an appropriate scale. The Agricultural Statistician should be administratively under the Agricultural Production Commissioner and should be physically located in the same office. He should be assisted by an adequate number of Statisticians, Assistant Statisticians, Economists, and lower staff.

(Paragraph 61.18.5)

79. At the Centre, the Agricultural Intelligence Division of the Directorate of Economics and Statistics, the National Sample Survey Organisation and IARS should be suitably strengthened.

(Paragraphs 61.18.6 to 61.18.8)

80. Suitable training courses should be developed for periodic training of statistical staff employed in the State and Central Offices.

(Paragraph 61.18.9)

81. For rationalisation of agro-economic research priority areas of research have broadly been spelt out. Institutions having field level staff like the agro-economic research centres, etc. can be entrusted with the type of studies which need collection of information from micro level units. Studies based on secondary data could preferably be arranged at postgraduate centres of research.

(Paragraphs 61.19.16 and 61.19.17)

82. Postgraduate students of the agricultural universities should be involved in the process of economic investigation, data collection and analysis by including investigational work in the field of agricul-

tural economics as an integral part of the curriculum prescribed for M.Sc. students in agricultural economics, applied statistics, etc.

(Paragraph 61.19.18)

83. Research scholarships or fellowships may be arranged at specialised institutions for systematic analysis of the information collected during the village surveys by the agro-economic research centres so as to provide an insight regarding the growth and development process of Indian economy. The cadre authority administering the Indian Economic Service and Indian Statistical Service should, in consultation with the Ministry of Agriculture and Irrigation, select eligible and competent candidates for these fellowships.

(Paragraph 61.19.20)

84. Farm management studies provide a lot of useful information and should be continued.

(Paragraph 61.19.21)

85. All important institutions engaged in agro-economic research should be represented on the Coordination Committee for organisation of micro-economic studies in the field of agricultural economics.

(Paragraph 61.19.25)

86. The Research Division and the Economic Policy Cell of Directorate of Economics and Statistics should be strengthened.

(Paragraph 61.19.26)

APPENDIX 61.1

(Paragraph 61.2.11)

Definition of Land Use Classification

Classification	Definition of the classification
1. Geographical area.	The latest figure of geographical area for the State/Union Territory/district based on the Surveyor General of India's data.
2. Reporting area for land utilisation purposes	The reporting area stands for the area for which data on land use classification of area are available. In areas where land utilisation figures are based on land records, reporting area is the area according to village papers i.e., the papers prepared by the village accountants. In some cases the village papers are not prepared for forest areas but the magnitude of such areas is known ; also there are tracts in many States for which no village papers exist but for which ad-hoc estimates of classification of area etc. are framed to complete the coverage. In such cases, reporting area should give the summation of the area for which village papers actually exist and the area for which ad-hoc estimates are available.
3. Forests	Area under forests includes all lands classed as forests under any legal enactment dealing with forests or administrated as forests, whether State-owned or private, and whether wooded or maintained as potential forest land. The area where crops are raised in the forest and grazing lands or areas open for grazing within the forests are included under the forest area.
4. Area not available for cultivation	
area under non-agricultural uses	All lands occupied by buildings, roads and railways or under water e.g., rivers and canals and other lands put to uses other than agricultural.
barren and unculturable land	This covers all barren and unculturable land like mountains, deserts, etc. land which cannot be brought under cultivation unless at a high cost shall be classed as unculturable, whether such land is in isolated blocks or within cultivated holdings.

APPENDIX 61.1 (Contd.)

Classification	Definition of the classification
5. Other uncultivated land including current fallow	
permanent pastures and other grazing lands	These cover all grazing lands, whether they are permanent pastures and meadows or not; village common grazing lands included under this head.
miscellaneous tree-crops and groves not included in the net area sown	Under this class is included all cultivable land which is not included under "net area sown" but is put to some agricultural use; lands under casurina trees, thatching grass, bamboo bushes and other groves for fuel etc., which are not included under orchards are classed under this category.
culturable waste	These include all lands available for cultivation whether not taken up for cultivation or taken up for cultivation once, but not cultivated during the current year and last five years or more in succession; such lands may be either fallow or covered with shrubs and jungles which are not put to any use (they may be assessed or unassessed and may be isolated blocks or within cultivated holdings) land once cultivated but not cultivated for five years in succession is also included in this category at the end of the five years.
6. Fallow lands	
fallow land other than current fallows	This refers to all lands which were taken up for cultivation but are temporarily out of cultivation for a period of not less than one year and not more than five years; the reasons for keeping lands fallow may be either poverty of cultivators or inadequate supply of water or malarial climate or silting of canal and rivers or unremunerative nature of farming.
current fallows	This class comprises cropped areas which are kept fallow during the current year; for example, if any seeding area is not cropped again in the same year it is treated as current fallow.
7. Net area sown	This represents the area sown with crops and orchards counting areas sown more than once in the same year only once.

APPENDIX 61.2

(Paragraph 61.3.1)

List of Forecast Crops and Year of Initiation of Regular Estimates

Crop	Year of initiation
Rice	1885
Jowar	1945-46
Bajra	1945-46
Maize	1945-46
Ragi	1947-48
Small millets	1951-52
Wheat	1884
Barley	1947-48
Gram	1947-48
Tur	1951-52
Other kharif pulses	1951-52
Other rabi pulses	1951-52
Groundnut	1896
Castorseed	1926-27
Sesamum	1885
Rapeseed & mustard	1885
Linseed	1885
Nigerseed	1965-66
Safflower	1966-67
Coconuts	1965-66
Cotton	1885
Jute	1885
Mesta	1952-53
Sann-hemp	1958-59
Sugarcane	1900
Tobacco	1949-50

APPENDIX 61.2 (Contd.)

Crop	Year of initiation
Potato	1949-50
Pepper (black)	1951-52
Chillies (dry)	1951-52
Ginger (dry)	1951-52
Arecanut	1966-67
Turmeric	1964-65
Banana,	1966-67
Guarseed	1964-65
Tapioca	1967-68
Cardamom	1969-70
Coriander	1969-70

APPENDIX 61.3

(Paragraph 61.3.3)

Size and Shape of the Plot employed in Crop Estimation Surveys

State	Dimensions and the shape of the plot(m)	Size (ha)	Exceptions unless otherwise specified* (dimensions of plots in metres)
(1)	(2)	(3)	(4)
Andhra Pradesh	5×5	1/400	for tur, castor, sesamum & cotton plot size is 10×10 i.e. 1/100 hectare.
Assam	5×5	1/400	—
Bihar	10×5	1/200	for tur, jute, mesta, sugarcane & rape & mustard plot size is 5×5 i.e. 1/400 hectare.
Gujarat	5×5	1/400	for castor and cotton plot size is 10×5 i.e. 1/200 hectare.
Haryana	10×5	1/200	—
Himachal Pradesh	10×2	1/500	—
Jammu & Kashmir	10×5	1/200	for potato 5×5 i.e. 1/400 hectare.
Kerala	5×5	1/400	—
Madhya Pradesh	5×5	1/400	for cotton 10m×11 rows of variable plot of size 1/200 hectare.
Maharashtra	10×10	1/100	for rice konkan and ragi the plot size is 10×5 i.e. 1/200 hectare and for cotton & tur the plot size is 20×10 i.e. 1/50 hectare.
Meghalaya	5×5	1/400	—
Karnataka	5×5	1/400	for tur, castor & cotton the plot size is 10×5 i.e. 1/200 hectare.
Orissa	circle of radius 4'	1/866 acres	for jute 16.5'×16.5' i.e. 1/160 of an acre.
Punjab	10×5	1/200	
Rajasthan	5×5	1/400	for cotton plot size is 10×5 i.e. 1/200 hectare.
Tamil Nadu	5×5	1/400	for cotton, sugarcane and groundnut plot size is 10×5 i.e. 1/200 hectare.

*The size and shape of the plots given in columns (2) and (3) are generally applied for almost all crops and the exceptions are presented in column (4).

APPENDIX 61.3 (Contd.)

		(3)	(4)
U.P. Pradesh	equilateral triangle of size 10	1/230.8	for sugarcane and jute plot size is 5×5 (1/400 hectare) & cotton 20×10 i.e. 1/50 hectare for sugarcane (factory area) the plot size is 10×10 i.e. 1/100 hectare.
West Bengal	circle of radius 5' 7"	1/435.6 acre	for tur and potato, sugarcane the plot size is $15' \times 15'$ i.e. 1/193.6 acre.
Dadra & N. Haveli	5×5	1/400	—
Delhi	5×5	1/400	—
Goa	5×5	1/400	—
Pondicherry	50 links \times 20 links	1/100 acre	—

APPENDIX 61.4

(Paragraph 61.3.3)

Percentage of Area covered by Crop-Cutting Surveys on Different Crops, 1973-74

Crop	Percentage of area covered by crop cutting surveys to the total area under the crop
cereals	
rice	97.1
jowar	99.6
bajra	99.7
maize	93.4
ragi	82.9
small millets	30.9
wheat	98.4
barley	98.9
total cereals	94.7
pulses	
gram	98.1
tur	77.9
other kharif pulses	2.4
other rabi pulses	53.0
total pulses	55.0
total foodgrains	87.5
oilseeds	
groundnut	96.0
castorseed	89.7
sesamum	52.6
rapeseed & mustard	40.1
linseed	51.0
total oil seeds	70.7

APPENDIX 61.4 (Contd.)

Crop	Percentage of area covered by crop cutting surveys to the total area under the crop									
fibres										
cotton	89.6
jute	98.1
mesta	28.8
other crops										
sugarcane	94.3
potatoes	44.6
chillies	8.5
tobacco	72.1
tapioca	83.4

APPENDIX 61.5

(Paragraph 61.4.4)

Method of working out Estimated Foodgrains Production for 1966-67 to 1972-73 on the basis of Estimated Consumption Requirements.

The estimated production of foodgrains for the period 1966-67 to 1972-73 given in Table No. 61.1 has been derived by working out the ex-post levels of consumption for these years and making due allowances for actual imports and changes in stocks. The estimates of consumption for this period have been derived by taking the availability in 1973-74 as an estimate of consumption for the year and by proceeding backwards after taking into account the composite effects of changes in population per capita incomes at constant prices and deflated prices of foodgrains for these years. Thus, the estimated consumption of foodgrains in each previous year is given by:

$$C_{t-1} = \frac{C_t}{\frac{(1+R)}{100}}$$

Where C_t = consumption of foodgrains in the t th year.

C_{t-1} = Consumption of foodgrains in the $(t-1)$ th year.

$$R = \left\{ \frac{(1+P_o)}{100} \frac{(1+Y E_y)}{100} \frac{(1+P_p E_p) - 1}{100} \right\} 100$$

Where, P_o = Percent change in population in the t th year over $(t-1)$ th year.

Y = Percent change in per capita income at (1960-61) prices in t th year over $(t-1)$ th year

E_y = Income-elasticity of demand for foodgrains.

P_p = Percent changes in the wholesale prices of foodgrains (i.e. in the index numbers of wholesale prices of foodgrains deflated by All Commodity Index) in the t th year over $(t-1)$ th year.

and E_p = Price elasticity of demand for foodgrains.

2. For this purpose, it has been assumed that the population has been growing at the rate of 2.2 per cent per annum during 1966 to 1971 and 2.1 per cent per annum during the period thereafter. The annual rates of growth of per capita income at constant (1960-61) prices given in the Economic Survey, 1974-75 have been adopted in this exercise. Further, for purposes of estimating the price effect on real demand, the Economic Adviser's Index Numbers of Wholesale Prices of foodgrains, deflated by All commodities price index has been used.

3. The following table gives the estimates of population, per capita real incomes and deflated Index Numbers of wholesale prices during 1966 to 1974.

	Population* (millions)	per capita** NNP at 1960-61 prices (Rs.)	Index numbers of wholesale prices deflated by all commodities index
1966 . .	493	310.9	118.5
1967 . .	504	308.2	135.5
1968 . .	515	328.4	126.0
1969 . .	527	331.7	120.1
1970 . .	539	343.1	117.0
1971 . .	551	351.8	112.7
1972 . .	562	348.4	118.5
1973 . .	574	337.4	117.3
1974 . .	586	340.1	124.7

Source : *Directorate of Economics & Statistics, Bulletin on Food Statistics, 1973. Pages 4-5.

**Ministry of Finance—Economic survey, 1974-75 page 59. The estimates for 1966 relate to 1965-66 and so on.

4. For purposes of this exercise the values of the income elasticity of demand and price elasticity of demand have been taken to be 0.46 and (—) 0.34 respectively¹. The estimates of net production and gross production of foodgrains consistent with the estimated levels of consumption on the basis of the above stated assumptions have been derived by making adjustments for imports and changes in stocks and allowing for the use of foodgrains for seed, feed and wastage at the rate of 12-1/2 per cent of gross production.

¹1962—Long Term Projections of Demand for and Supply of Selected Agricultural Commodities, 1960-61 to 1975-76: 80, New Delhi, NCAER.

APPENDIX 61.6

(Paragraph 61.6.6)

Concepts and Definitions for Surveys on Fruits and Vegetables.

A. FRUITS

1. Tree of bearing age:

A tree of bearing age may be regarded as a tree which has attained the age at which 95 per cent of the trees are normally expected to bear fruits. The bearing ages for different fruit crops may be taken as follows:

(i) guava, plum, apricot, peach, sapota, lime and other citrus fruits	4 years
(ii) mango and litchi	5 years
(iii) grape vine	3 years
(iv) papaya	18 months
(v) apple	7 years
(vi) pear	6 years
(vii) walnut	10 years

It may be noted that the bearing ages as given above are only indicative. The States may suitably modify these ages according to the agro-climatic conditions prevailing in the State.

2. Bearing tree:

The bearing tree is regarded as the one which has attained the bearing age as specified under (1) and has also borne fruits during the season/year under survey.

3. Non-bearing tree:

A tree of bearing age which fails to bear fruits during the season/year under survey due to any reasons such as disease, old age, withering of flowers etc. is regarded as non-bearing tree.

4. Young tree:

Young tree is the one which has not attained the fruit bearing age as yet.

5. Orchard:

A compact piece of land which is at least 1/10th of an hectare area in size or is having at least 12 trees planted on it, may be regarded as an orchard.

It may be clarified that in the case of such fruit trees where distance between the trees is quite large say more than six meters as in the case of mangoes, the orchard will be defined according to the minimum number of 12

trees planted in it while, in such cases where the distance is less than six meters as in the case of bananas, papayas, grape vines etc., the orchard will be defined on the basis of the minimum area of 1/10th of an hectare.

6. Stray or scattered trees:

Trees not planted in orchards, those planted in clusters of less than 12 trees, or those in a piece of land less than 1/10th of an hectare as well as those planted in back-yard of houses, along the roads, river banks etc. are regarded as stray or scattered trees,

7. Young and bearing orchards:

A young orchard is defined as the one in which at least 90% of the trees planted have not attained the bearing age during the year under survey, otherwise it will be regarded as a bearing orchard.

8. Extent of cultivation of fruits:

Extent of cultivation of fruits includes:

- (i) total number of fruit trees categorised as bearing, non-bearing and young.
- (ii) number of orchards categorised as bearing and young and
- (iii) area under orchards.

9. Area under orchards of a given fruit crop:

In a tract or a region, the sum-total of areas under all orchards in which a minimum number of 12 trees of a given fruit crop are planted or those orchards having area more than 1/10th of an hectare will be regarded as area under orchards of a given fruit crop in the tract. It may be remarked that this area will include all such area occupied by vacant spaces in the orchards, mixed crops other than the given fruit crop grown in the orchard, wells, huts and bunds etc.

10. Net area under a given fruit crop:

Net area under a given fruit crop is defined as the area occupied by trees of the given fruit crop alone excluding all such areas occupied by vacant space, wells, huts and area under mixed crops including area occupied by fruit crops other than the given fruit crop planted in the orchards of a given fruit crop. This area could be obtained by estimating the number of fruit trees planted in the region and average area occupied by a single tree as estimated from average spacing between the trees planted systematically in rows and multiplying these two estimates i.e. the estimate of number of trees of a given fruit crop by the estimate of average area occupied by a tree of that crop.

11. Average yield per tree of bearing age:

By average yield per tree of a bearing age is meant the average yield per tree of bearing age as specified in (1) in terms of weight as well as count of fruits.

12. Average yield per bearing tree:

The average yield per bearing tree is the average yield obtained from trees of bearing age which have borne fruit during the season/year under survey in terms of weight as well as count of fruits.

B. VEGETABLES

1. Vegetable :

Vegetable is an agricultural product which is used for human consumption and eaten as raw or in cooked form alongwith cereals. We may broadly classify different vegetable crops in the following categories:

- (i) fresh vegetables
- (ii) root crops
- (iii) peas and beans

NOTE: Onions and green spice crops are excluded from this definition.

The fresh vegetables may be categorised as

- (a) leafy vegetables include fenugreek (*methi*), *palak*, *chulai* etc.
- (b) gourds including bottle gourd, bitter gourds, skuash melon and sponge-gourd etc.
- (c) other vegetables such as lady's finger, cabbage, brinjal, tomato, cauliflower, etc.

Root crops may include potato, arvi, *zimikand* etc.

Beans may include green peas, french beans etc.

2. Vegetable field:

A vegetable field is a compact piece of land in which vegetables are grown either as pure or in mixed form or as intercrops. For the purpose of survey the minimum size of such field in plains should be 0.05 hectare and in hilly areas it should be 0.02 hectare.

3. Mixed vegetable field:

When in a field, two or more vegetable crops are sown in such way that it is difficult to apportion the area under each crop and also, when percentage of any single crop does not exceed 90% of the total number of plants in the field then, such field will be regarded as under mixed vegetables. Vegetables sown in mixed form are harvested more or less during the same period.

4. Pure vegetable field:

A pure vegetable field is the one in which either a single vegetable crop is sown at a time or the percentage of the number of plants of the main vegetable crop is more than 90.

5. Inter-crop/support-crop :

Inter or support crop is the one which is sown alongwith certain other field or horticultural crop in a systematic form e.g. vegetables sown in the vacant spaces in a mango orchard or those sown as support crops in a young orchard. Vegetables which are sown in a mixed form such that when harvesting of one vegetable crop is more or less completed, the harvesting of second crop commences—12.

mences will also be regarded as inter-crops. When sown alongwith certain field crops, the area will be accounted for vegetables only when the plant ratio of vegetables is at least 25%.

6. Area under a given vegetable crop:

The area under a given vegetable crop in a tract is the total of areas of fields sown under that vegetable. The areas under such fields in which the given vegetable is sown in a mixed form will be regarded as inter-crop as if the entire area were under that crop.

7. Area under vegetables :

Area under vegetables may be measured as net area or cropped area.

- (i) Net area under vegetables is the area under cultivation of vegetables during the given agricultural year excluding area sown more than once.
- (ii) Cropped area under vegetables is the total area under all the vegetable fields sown during the year including area sown more than once during the year as well as area under mixed crop counted as many number of times as the number of mixed crops sown in the field. Alternatively cropped area may be defined as total of areas under different vegetable crops grown in the agricultural year.

8. Crop-cutting plot:

For the purpose of estimating the production of vegetables, the random plot having a size of 5 x 5 sq. meters will be regarded as a crop-cutting plot. However, for conducting surveys in Hill areas where cultivation of vegetables is done on terraces, the size of such plot may be smaller suiting the conditions of the crop.

9 Sowing date:

Sowing date of any vegetable crop will be week and month during which the vegetable seeds are sown in the field or transplantation of seedlings takes place.

10. Period of harvesting:

Period of harvesting of any vegetable crop will be regarded as total period between the first picking and the last picking when, either the crop is completely harvested or the vegetable field is ploughed for sowing the next crop.

11. Vegetable season:

Different vegetables are sown during different periods. In fact, for some of the vegetables, the total sowing and harvesting period may be less than 80 days. It is rather difficult to define the season for each and every vegetable. Sometime, the harvesting and sowing of vegetables in different fields goes on simultaneously. We may broadly divide the year into three seasons viz. winter season starting from October to February, summer from March to June and rainy from July to October. In order to collect reliable data on the extent of cultivation of vegetables it is necessary to completely survey the selected villages during each of the three seasons. For a given vegetable, its season will be the one in which majority of the crop is harvested.

APPENDIX 61.7

(Paragraphs 61.7.6 & 61.7.10)

Concepts and Definitions of Terms used in Irrigation Statistics

1. **Irrigation requirement.**—The quantity of water, exclusive of precipitation, that is required for crop production. It includes economically unavoidable wastes.

2. **Net area sown.**—This is the total of area sown with crops and orchards counting areas sown more than once in the same agricultural year only once.

3. **Total cropped area or gross area sown.**—This is the sum of areas under all crops and represents the sum of net sown area and area sown more than once in the year.

4. **Intensity of cropping.**—This is the ratio of gross (total) area sown to the net area sown expressed as a percentage. . .

5. **Net irrigated area.**—This is the total area irrigated, counting area irrigated more than once on the same land in an agricultural year, only once.

6. **Gross irrigated area.**—This is the total of irrigated area under various crops during the year, being the sum of net irrigated area and area irrigated more than once in the same year.

7. **Intensity of irrigated cropping.**—This is the ratio of gross irrigated area to net irrigated area, expressed as a percentage.

8. **Crop irrigation ratio.**—This is the ratio of irrigated area under a crop to the total area under the same crop expressed as a percentage.

9. **Gross command area (GCA).**—The total area (including unculturable area under habitation, roads, tanks, wastelands etc.) covered by a specific irrigation project.

10. **Culturable command Area (CCA).**—This represents the culturable area in the gross command area.

11. **Intensity of irrigation.**—This is the gross irrigated area in an agricultural year expressed as a percentage of the projects culturable command area.

12. **Tanks.**—Pre-Independence storage schemes which were designated as tanks in irrigation statistics. Those which irrigate more than 1600 hectares net should be classified as large tanks and the rest as small tanks.

13. **Major Irrigation schemes.**—All surface water schemes having a CCA of more than 10,000 hectares.

14. **Medium Irrigation schemes.**—All surface water schemes having a CCA of less than 10,000 hectares but more than 1600 hectares come under the purview of medium irrigation schemes.

15. **Minor Irrigation Schemes.**—The classification of irrigation schemes as minor introduced since the beginning of Planning era has been based on different criteria viz. cost criterion during the Five Year Plans and physical criterion for the pre-Plan schemes. The cost criterion has been further subject to

the proviso that the scheme should also have an independent water source. Any scheme catering for alterations or extensions in the existing major medium schemes does not come under the purview of minor irrigation. The criteria adopted for the purpose during different periods are as indicated below:

- (i) Pre-Plan period.—Pre-plan schemes irrigating individually 1600 hectares or less come under the purview of minor irrigation schemes.
- (ii) Beginning of First Five Year Plan to March 1965.—Schemes individually costing less than Rs. 10 lakhs come under the purview of minor irrigation schemes.
- (iii) April 1965 to March 1970.—Schemes individually costing less than Rs. 15 lakhs come under the purview of minor irrigation schemes.
- (iv) With effect from April 1970.—Schemes costing individually less than Rs. 25 lakhs in the plain areas and less than Rs. 30 lakhs in the hill areas come under the purview of minor irrigation.
- (v) Now recommended.—Schemes having a CCA of 1600 hectares or less.

16. Storage schemes.—Storage schemes include tanks and reservoirs which impound water of streams and rivers for irrigation purposes.

17. Diversion Schemes.—These schemes aim at providing gravity flow irrigation by mere diversion of stream water supply without arranging any storage. They consist of weir (called 'anicut' in the south, 'bandhara' in Maharashtra and Gujarat and 'thingal' in Manipur) constructed across the stream for raising and diverting water and a canal system to carry the diverted water to the fields. The channel carrying water is also known by various names in different regions. It is called, 'Khul' in the hilly areas, 'pyne' in Chhotta Nagpur (Bihar), 'dong' in the Assam region, and 'low khong' in Manipur.

18. Public Surface Water Lift Irrigation Projects.—In regions where the topography does not permit direct flow irrigation from rivers or streams and lakes, water has to be lifted through pumping. Lift irrigation projects comprising pumping plants installed on rivers, streams or lakes and conveyance and distribution systems, executed and operated by Government come under the purview of public lift irrigation projects.

19. Private Surface Water, Lift Irrigation Schemes.—Private pumping installations and distribution system by individual or group of farmers on surface water sources fall under the category of private lift irrigation works.

20. Tubewells (including Bore Wells and Filter Points).—Tubewell essentially consists of a deep bore drilled into ground with the purpose of tapping ground water through one or series of permeable layers of water bearing strata. Tubewells drilled in the predominantly hard rock areas, where the bores can stand on their own and where lining by blind pipes is not necessary, are called bore wells. Generally, strainers are not provided in bore wells.

Small diameter shallow tubewells installed in the soft alluvial formations or the coastal regions are called filter points. The artesian/sub-artesian wells in which water rises higher than the water table in the upper strata also come under the purview of the tubewells.

Tubewells operated and maintained by the State Departments, Public Corporations, Cooperative Societies or on community basis come under the pur-

view of *Public tubewells* and others owned by individual farmers as *Private tubewells*.

21. Dugwells.—As distinguished from tubewells, dugwells comprise open surface wells of varying dimensions, dug or sunk from the ground surface into the water bearing stratum to extract water for irrigation purposes. Usually three types of wells are constructed: (a) masonry wells; (b) wells in rocky sub-strata; and (c) kutcha wells.

APPENDIX 61.8

(Paragraph 61.1.17)

Model Tables for Collection of Statistical Data in respect of Major and Medium Irrigation Projects for Preparation of the Annual Administrative Reports of the State Irrigation Departments.

Table 1.—Specimen table for “Run-of-the River” Schemes

Sl. No.	Name of project	Total cost of project (Rs. lakhs)	Year of completion	Source of water and location of head-works	Districts served	Maximum discharge of river at weir-site (cumecs)		Maximum discharge of the canal (cumecs)	
						ever recorded.	during the agricultural year	as designed	during the agricultural year
1	2	3	4	5	6	7	8	9	10

Table 2.—Specimen table for Storage Schemes

Sl. No.	Name of project	Total cost of project (Rs. lacs)	Year of completion	Source of water & location of dam	Districts served	Designed storage capacity (M.cu.m.)		Minimum storage ever recorded (M.cu.m.)	Maximum storage recorded during the agricultural year (M.cu.m.)	Maximum discharge in the main canals (cumecs)	
						Gross	Live			As designed	during the agricultural year
1	2	3	4	5	6	7	8	9	10	11	12

APPENDIX 61.8 (Contd.)

Table 3.—Specimen table for Major and Medium Irrigation Projects

Name of Project	Whether "run-of- the- river" scheme(R) on storage scheme(s)	Source of water	Command area (in hectares)		Length (in Kms) of channels in operation during the agricultural Year.			
			Gross	Culturable	Main canal and branches	Distribu- taries and minors	Drains	Escapes and other channels
1	2	3	4	5	6	7	8	9

Table 3 (contd.)

Season	Designed irrigation potential (ha)	Intensity of irrigation (percentage)	Actual irrigation (ha)	Number of days of water running in		Average discharge in the main canal (in cumecs)	
				Main canals and branches	Distributaries in minors	at head	at outlet
10	11	12	13	14	15	16	17
Kharif							
rabi							
hot weather (or summer)							
full agricultural year							

APPENDIX 61.8 (Contd.)

Table 3 (contd.)

Season	Area irrigated during the agricultural year		Area irrigated per cumec (in hectares)	Actual rainfall in command area (in mm)
	Flow area (in hectares)	Total lift area In outlet commands (in hectares)		
	18	19	20	21
Kharif				
rabi				
hot weather (or summer)				
Total				

Table 4.—Districtwise Crop Areas Irrigated in the year

Sl. No.	District	Project (s) furnishing irrigation supplied	Area (in hectares) irrigated in the district by the project					
			Kharif Season					
			Rice	Jowar	Maize	Cotton	other Kharif Crops	Total Kharif
1	2	3	4	5	6	7	8	9

APPENDIX 61.8 (Contd.)

Table 4 (contd.)

Area irrigated (in hectares) in the districts by the project									
Rabi Season					Hot weather or summer season				
Wheat	Barley	Rice	Other Rabi crops	Total Rabi Crops	Rice	Other Summer crops	Total summer crops	Sugarcane	Total for all crops in all seasons
10	11	12	13	14	15	16	17	18	19

Table 5.—Distributary-wise particulars regarding different projects

Name of the Project.....Main Canal.....Distributary name and/or number.....

Season/Year	Particulars related to waterings as per project design and actual seasonal achievement					
	Total number of waterings		Average interval (in days) Delta at distributary head in between Waterings			
	Designed	Actual	Designed	Actual	Designed	Actual
1	2	3	4	5	6	7
1. kharif						
2. rabi						
3. hot weather (or summer)						
4. whole agricultural year						

Note.—Delta at distributary head is worked out by dividing the total volume of water supplied at distributary head during the period (Kharif, Rabi, Hot weather and the whole agricultural year) by the area irrigated during the period.

APPENDIX 61.8 (Concd.)

Table 6.—Fortnightly rainfall in the canal command during the year

Fortnight ending (date)	Total actual rainfall in the fortnight (in mm)	Normal total rainfall in the fortnight (in mm)	Departure of total rainfall from normal (+ or -)	Average actual rainfall per day (in mm)	Maximum rainfall in a day (in mm)	Minimum rainfall in a day (in mm)	
1	2	3	4	5	6	7	8

APPENDIX 61.9

(Paragraph 61.9.2)

Classification of Fishing Craft and Tackle adopted in the Livestock Census, 1972.

A. mechanised boats:

- | | | |
|------------------|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (i) gill netters | } | classified into those having (a) length upto 30 ft. and (b) length 30 ft. and above; further sub-classified into horse power upto 25; 26 to 100; and above 100. |
| (ii) trawlers | | |
| (iii) liners | | |
| (iv) others | | |

B. non-mechanised crafts:

- (i) beach seine boats
- (ii) plant built boats
- (iii) dugout canoes
- (iv) catamarans
- (v) others

C. fishing gears:

- (i) drag nets—cotton twine, hemp twine and synthetic twine.
- (ii) gill nets—cotton twine, hemp twine and synthetic twine.
- (iii) trawl nets—cotton twine and synthetic twine.
- (iv) cast nets— -do- -do.
- (v) traps
- (vi) shore seines
- (vii) spawn collecting nets.
- (viii) others.

APPENDIX 61.10

(Paragraph 61.10.4)

Forests Area According to Land Utilisation Statistics and Indian Forest Statistics during 1970-71.

(thousand hectares)

State/Union Territory	Forest area 1970-71		Increase (+) or Decrease (—) in IFS over LUS	
	I.F.S.	LUS	Absolute	Percent
1	2	3	4	5
Andhra Pradesh	6496	6337	159	2.51
Assam (including Meghalaya & Mizoram)	4506	3565	941	26.40
Bihar	2921	2928	(—)7	(—)0.24
Gujarat	1739	1634	105	6.43
Haryana	148	99	49	49.50
Himachal Pradesh	2144	2782	(—)638	(—)29.33
Jammu & Kashmir	2104	2776	(—)672	(—)32.21
Karnataka	3510	2890	620	21.45
Kerala	1111	1055	56	5.31
Madhya Pradesh	16885	14459	2426	16.78
Maharashtra	6618	5417	1201	22.17
Manipur	602	602	—	—
Nagaland	288	266†	22	8.27
Orissa	6746*	4973	1773	35.65
Punjab	211	123	88	71.55
Rajasthan	3690	1355	2335	172.32
Tamil Nadu	2248	2013	235	11.67
Tripura	630	630	—	—
Uttar Pradesh	4953	4952	1	0.02
West Bengal	1186	1101**	85	7.72
Andaman and Nicobar Is- lands	747	740	7	0.95
Arunachal Pradesh	5154	5154	—	—
Dadra & Nagar Haveli	n.a.	21	—	—
Delhi	4	1	3	300.00
Goa, Daman & Diu	131	105	26	24.76
All India	74772	65978	8794	13.33

*1968-69 figures repeated.

n.a.—not available.

**Refers to the year 1967-68.

IFS—Indian Forest Statistics

†Refers to the year 1956-57

LUS—Land Utilisation Statistics

Source: Directorate of Economics and Statistics.

ADMINISTRATION

1 INTRODUCTION

62.1.1. Agriculture is by and large a private enterprise involving millions of farmers—large, medium, small and marginal. In Chapter 2 on Historical Review the development of the administrative structure for agriculture has been briefly explained. Till 1944, there was not much of administrative involvement in intensive cultivation at the field level. The developments during the Second World War and after the Partition of the country which led to imbalances between demand and supply of various agricultural crops, brought to focus the necessity for the State to involve itself in increasing the production of agricultural commodities, particularly cereals, jute and cotton. As the pace of development had to be stepped up, a closer involvement of administration with the farmer was found necessary in order to enthuse him, provide him the technical know-how, find the necessary inputs for him and solve various problems that might arise in intensive agricultural development from season to season. Wherever intensive programmes were introduced, the staff support to the programmes was increased. Following the Report of the Grow More Food Enquiry Committee, a National Extension Service (NES) was found desirable and necessary to continuously liaise with the farmers and assist them in achieving higher production. The NES was made a part of the Community Development Programme in 1952. Whilst agricultural administration was expanded, the then existing administration was deprived of the full use of the wide spread NES agency at the village level because of the Community Development Programme which put this base level organisation under the control of the elected representatives at the block level. In 1958, the Report of the Nalagarh Committee¹ drew attention to the need for technical expertise to be made

¹ Agricultural Administration Committee, 1958.

available at the district level to support intensive programmes of agriculture. Further experimentation on the administrative structure for intensive cultivation was done in the Intensive Agricultural District Programme (IADP) introduced in 1961. The next important landmark in the development of agricultural administration was the Report of the Ram Subhag Singh Committee¹. This Committee recommended a unified structure at the State headquarters under an Agricultural Production Commissioner (APC) to bring about coordination amongst the various departments which contribute directly towards agricultural development.

62.1.2 In 1965, a further dimension was added to the agricultural programme with the introduction of the High Yielding Varieties Programme (HYVP) and the new strategy for agricultural development. The main elements of the new strategy consisted of the use of new seed varieties responsive to intensive application of fertilisers, water management and judicious application of pesticides.

62.1.3 Along with these programmes of crop production, animal husbandry development was also intensified with introduction of the Intensive Cattle Development Projects (ICDP), Intensive Poultry Development Projects (IPDP) and similar projects for sheep and pigs. In fisheries, marine fishery was supported with the setting up of various Institutes to deal with different aspects of research and training. The initial base for an intensive inland fisheries exploitation programme was also laid. A farm forestry programme which dealt with farmers and community involvement in growing trees for domestic use was also added in the farm sector. Thus from several angles, an attempt was made to increase the production and productivity under various sectors of agriculture based on the rapidly advancing science in these various fields. This scientific advancement was facilitated firstly by strengthening the Indian Council of Agricultural Research (ICAR) and funding it for expanding the research base and, secondly, by a simultaneous expansion and development of the new agricultural universities. From 1965, therefore, there has been a sudden spurt in activity in several sectors of agriculture based on advancement of scientific knowledge. However, the basic administrative structure for agricultural development was found wanting when increased demands were made on it by scientific agriculture. The structure of agricultural administration to suit the demands of modernisation and application of new technology including the arrangements for coordination at various levels are dealt with in this

¹Working Group on Inter-departmental and Institutional Coordination for Agricultural Production, 1963.

chapter. The emphasis is on securing a single line of control from the field level to the State headquarters, giving full powers and responsibilities to the technical officers in the administration of agricultural development programmes and strengthening of the field level organisations.

2 ROLE OF STATE

62.2.1 Scientific agriculture is commercially viable and theoretically it is neutral to scale. It may be argued that agriculture being a private enterprise, there is very little necessity for the State involving itself in meticulous details in organising agricultural production. As every aspect of scientific agriculture is commercially viable, the commercial sector of the economy may be expected to throw up the necessary institutions and organisations to support the farmer. Those with experience of agricultural economy in Western countries may, from their own experience, raise these doubts. Indian agriculture, even after modernisation, presents a completely different picture from that of the development of agriculture in the Western countries. In this country, the size of the farm is very small, the average operational holding being of the order of 2.3 hectares. Nearly 70 per cent of the farm holdings are below two hectares*. A commercial infrastructure which can reasonably price its services to the farmer can be developed by the normal private sector operations only if the per client business is of a reasonable magnitude to support an infrastructure of expertise. The individual demand of the bulk of the farmers in this country being too small for commercial enterprise, it has been found that even in areas of intensive agricultural development, commercial enterprise by itself is able to cater to the needs of only the larger farmer. Because of this constraint, the country has opted, decades ago, for a cooperative structure for credit, marketing and supplies so that by bulking the demands of a large number of small units, the cooperatives with a substantial amount of honorary labour can become the vehicles of reasonably priced supplies to the farming community. In most areas, cooperatives being only legal entities, without the active understanding of the cooperative principle by the members, their development had to be very much of a government sponsored and directed operation. The State had, therefore, to

*Agricultural Census, 1970-71.

involve itself quite intimately with the programme of agricultural development to the extent of supporting the entire logistics of the operation.

62.2.2 Towards the end of the Fourth Plan, it was found that the new agriculture was creating further imbalances in the rural economy. Though scientific agriculture is neutral to scale, the large farmers got tremendous benefits from this new strategy, but the small and marginal farmers were not able to get the necessary increase in their incomes because they could not adopt it due to various difficulties of a socio-economic character and organisational and supply deficiencies in the rural sector. Growth with social justice having been accepted as the main policy of rural development, administration had to step in to see that the benefits of scientific agriculture were also available to the small and marginal farmers along with the large farmers. Various pilot programmes like those of Small and Marginal Farmers and Agricultural Labourers Development Agencies, Drought Prone Areas Programme (DPAP), Command Area Development (CAD), programmes for development of milk production, poultry, sheep and pigs through small and marginal farmers and agricultural labourers are being tried out in various parts of the country. This experience is being utilised to develop organisational and administrative structures which can deal with the basic problems of growth with social justice.

62.2.3 From the beginning, the field services in crop production and animal husbandry have been manned by technical personnel. In fisheries, a technical organisation is being built up, though personnel with training in fisheries sciences at the B.Ss. level are yet to become available. The forestry personnel are trained in the science of forestry after recruitment to the service. The NES added the Village Level Worker (VLW) to the existing lines of field personnel. The VLW is a technician trained for a multi-purpose role mainly in crop production and animal husbandry. The State Departments of Agriculture and Animal Husbandry had for long been dealing with the dual problems of research and administration. They were also directly responsible for education. After the Report of the Second Joint Indo-American Team on Agricultural Education, Research and Extension (1960), when it was decided that research, education and extension education would be made the sole responsibility of the new agricultural universities, there was a clear bifurcation of responsibilities between the research and education wings under the universities and the administrative wing under the departments in the States. In several cases the technical personnel who

had kept *au fait* with the developments in the scientific field and who had the requisite qualifications, preferred to migrate to the universities and the colleges depleting the State Departments of scientifically highly qualified staff. As a result of this, in many cases, these persons lost touch with the advances made in their respective scientific fields. Having divided the responsibility between research and administration, a way had to be found to bring about the necessary coordination between research and extension and also to ensure that the technical staff in the administration continued to maintain technical competence. In the Interim Report on Some Aspects of Agricultural Research, Extension and Training, we had dealt with this matter and given the recommendations for maintenance of the technical efficiency of the departments.

62.2.4 A farmer engaged in traditional agriculture requires some help from the State for carrying out his operations. Mostly this would be in the nature of making supplies available and regulatory functions to ensure that the farmer is not cheated in the materials which are supplied or in the marketing of his produce. Scientific innovations are transferred very slowly in such a system. In the exigencies of 1965 and 1966, the decision was taken to activate growth by rapidly utilising the already available scientific knowledge and simultaneously increasing the pace of scientific research so as to rapidly fill up gaps in knowledge and providing new methods of increasing productivity. The most important problem then became that of transferring what was known to the scientist, to the farmer for application under field conditions, though the pressures of the new strategy in agriculture were yet to develop. The Nalagarh Committee had foreseen this problem when they recommended the support of a technical group at the district level to help the agricultural officer at that level in tackling promptly the scientific problems in the field. With the new emphasis on application of science and technology in all sectors of agriculture, the problem has become one not only of providing technical guidance but establishing a structure which will enable the transference of the knowledge to the field.

Administrative Structure

62.2.5 The administrative structure in a development field at any point of time has to meet the requirements of the people for an effective support to their effort. During the last ten years, as the pressures of scientific agriculture in many fields developed, there has been a continuous dialogue between the States and the Centre as to the best form of administration to tackle the multifarious problems

that were being posed. At present, we can identify broadly the following important lines of development which need administrative support. They are:

- (i) a continuous research effort for finding the best high-yielding varieties of various crops now under cultivation and in the new crops that can be usefully introduced to meet particular deficiencies like that of vegetable oils;
- (ii) continuous testing of new varieties for their agro-climatic suitability in the various regions of the country and then transferring this knowledge to the farmer;
- (iii) continuous research in dealing with the pest and disease problems that exist and that may arise with intensive development of various fields of agriculture;
- (iv) organising early reporting systems for pest and disease problems that exist and that may arise;
- (v) organising the supply of necessary inputs particularly fertilisers, organic manures pesticides, fungicides, credit and the infrastructure to support modern, intensive crop production;
- (vi) identifying institutions, developing them and providing the necessary support to groundwater exploitation, land development, subsidiary occupation and area development programmes;
- (vii) intensify research in different spheres of animal husbandry;
- (viii) provide for the necessary support to intensive animal husbandry development with necessary advisory and other services needed to solve multifarious problems of genetic improvement, feeding health services, credit, input supplies and marketing;
- (ix) support an intensive fisheries programme both inland and marine with necessary advisory services, supplies and infrastructure;
- (x) building up the technical expertise to support a farm forestry programme and organise supplies and services to farmers and communities;
- (xi) initiate work on balanced mixed farming systems and assist farmers in evolving best combinations of farm enterprises depending on available resources and technical know-how; and
- (xii) formulate coordinated agricultural plans at various levels within the framework of the overall plan.

62.2.6 In Chapter 60 on planning, we have recommended that planning, coordination and evaluation should be carried out at three different levels viz., district, State and Centre. A suitable administrative structure has to be built to deal with the various lines of development suggested in the preceding paragraph. In Chapter 8 on Centre-State Relations in Agricultural Development, we have analysed in detail the inter-play between State and Central responsibilities in implementing the national programme for agricultural development. The administrative structure has to take note of the various links between the State and the Central administrations. Keeping in view all these factors, the needs of administrative structures at the three levels and the possible forms of the structure itself have been discussed in the following sections of this chapter. Administration has to keep pace with the changing needs of the developmental process. In the later sections of this chapter, we have examined the possible lines of growth and changes which, in our view, can be deliberately fostered and brought in to speed up the process of development.

3 FIELD LEVEL ADMINISTRATION

62.3.1 The field level administration in various disciplines of agriculture is generally controlled and run from the district headquarters. Striking a balance between the need for agricultural planning on a regional basis and the present administrative structure, we have recommended in Chapter 60 on Planning that the district may be kept as the unit for planning and evaluation. In many States, where scientific agriculture has already developed, the field unit of the existing Department of Agriculture is at a level lower than the district i.e., a taluk/block level. In some States, the Agricultural Officer who controls the field organisation is at the taluk level or in charge of two or three blocks. The district level officer has really a supervisory role over the various field functionaries. A district organisation has also to plan and implement the details of the programmes of crop production and land improvement. In animal husbandry, in most States, the field control is still at the district level. In fisheries, similarly, the control is at a district or even a higher level. In forestry, if and when our recommendations on farm forestry are implemented, there will be an officer at the district or divisional level in charge of the programme in that district where farm forestry is substantial. For administrative purposes, therefore, we recommend that the district be taken as the basic unit of agricultural administration.

62.3.2 The principal Field Officer in all these disciplines as and when appointed will have at the next lower level a technical graduate in command. In crop production, at present the Agricultural Extension Officer (AEO) or similar posts are generally manned by agricultural graduates. In our Interim Report on Some Aspects of Agricultural Research, Extension and Training, we have recommended that to provide support to the VLWs there should be five to six AEOs, who are graduates in agriculture, in every block. In the field of animal husbandry, the veterinary dispensaries are manned by veterinary graduates and other developmental activities are also generally looked after by veterinary graduates. In fisheries and forestry, the type of field level organisation will depend very much upon the developments that take place on the basis of our recommendations on fishery and farm forestry development.

Village Level Worker

62.3.3 The lowest level field worker in the NES is the VLW. This functionary is generally a matriculate trained for two years, mainly in crop production and land improvement, but also in the main field programmes of animal husbandry. The VLW is also trained in the basics of public health, social education and cooperation. The competence of this functionary to transfer knowledge of scientific agriculture to the field was questioned. Various surveys carried out so far indicate that for promoting well laid out mass programmes in crop production and animal husbandry, the VLW is a competent functionary. Having been trained specifically in the art of explaining the technology to the farmer and having been trained in working with the farmer to translate these ideas into practice in the field, the VLW has been able to carry across effectively the message of scientific agriculture in such programmes. For this purpose, the VLW must be given in service training to keep him upto date with the changes in technology and the new scientific ideas. The type of in-service training being given to VLWs at present is of very routine type and many times repetition of what has already been taught in the pre-service course. Also the interval between refresher courses is too long, sometimes upto 8—10 years. In the fast improving agro-techniques, it is necessary to have refresher courses as frequently as possible, say once in three years; they should be of shorter duration and must deal with new scientific developments and field problems. With such periodic training the VLW will be useful for translating mass programmes of crop production, animal husbandry and even fisheries to the farmers.

62.3.4 The VLWs will continue to be multipurpose workers but they will deal with different disciplines of crop production, water management, animal husbandry, fishery and farm forestry only. Of the ten VLWs in the block, under the general pattern, eight may be allotted for this work and two may look after extension work in spheres other than agriculture. These two VLWs will work under the Block Development Officer (BDO) whereas the other eight will work under the Block Agricultural Development Officer (BADO) referred to later in this chapter through the extension officers in the respective disciplines.

62.3.5 In the draft Fifth Plan, a massive programme of scientific animal husbandry has been suggested as a commercial proposition. This programme necessitates a strong animal health organisation and an active extension agency in animal husbandry. Wherever such intensive programmes develop, the VLW will find himself increasingly incapable of handling the rapidly changing technology. Similarly, in fisheries with intensive composite rearing of fish, brackish water culture and mariculture, the lowest level functionary will have to be specially trained in fisheries technology. In forestry already there is a hierarchy of Rangers and Foresters who will obviously man the lower levels of the farm forestry structure. It is thus expected that as the need for application of scientific knowledge develops in the various sectors of agriculture, a division of labour will have to develop from the lowest level functionary upwards. This raises the basic problem of coordination at the various levels. These levels can be taken as the village, the taluk/block and the district.

Division between Scientific and Administrative Staff

62.3.6 Though the field control organisation in the various disciplines of agriculture will be a technical one, the bulk of the work of the functionaries at various levels will be in the nature of development administration, demonstrations, coordination of supplies and regulatory functions. Scientific agriculture today is highly specialised and comprises various subject-matter fields even within a branch of agriculture. Competence in the various concerned sciences is required to tackle the problems of intensive agriculture. It cannot be expected that the field organisation will be able to tackle all the scientific problems that arise. It is against this background that the Nalagarh Committee recommended that a group of technical experts should be attached to the District Agricultural Officer to give him effective support in technology. In our Interim Report on Some Aspects of Agricultural Research, Extension and Training, we have

recommended that a time has come now to set up the expert group at the taluk/block level for crop production. For other disciplines like animal husbandry, fisheries and farm forestry, the levels will have to be determined according to the intensity of the programme in any area. For every one of these disciplines the field administrator requires the support of a group of experts in the various sciences relevant to the situation.

62.3.7 After the establishment of the agricultural universities, in many States, two water-tight compartments have been formed between the scientists in the fields of research and education, and those concerned with departmental administration. The situation got worsened in States where the universities had siphoned away all the highly qualified scientists. This led to deterioration of technical competence of the development administration. The undesirable situation cannot be allowed to continue. We have, therefore, recommended in our Interim Report on Some Aspects of Agricultural Research, Extension and Training that in order to maintain technical competence in State departments, provision should be made for the exchange of staff at appropriate level between the universities and departments on deputation basis.

Role of Panchayati Raj Institutions

62.3.8 Historically, the NES which was contemplated as a developmental structure from the village to the district level, got merged in the Community Development Programme and was later passed on to the Panchayati Raj Administration. In most States, panchayati raj has a three-tier organisation comprising the zila parishad at the district level, panchayat samiti at the block level and the village panchayat at the village level. It was easy to link up the VLW with the village panchayats, the next higher level of technical experts, namely, AEO with the block level and the District Officer with the zila parishad. This link up between the administration and the policy making elected body is theoretically a good combination where mass response to the State programmes has to be secured. This arrangement worked reasonably satisfactorily as long as the programmes were limited to marginal improvements of traditional agriculture which everybody, particularly the elected representatives of the people, could understand. With the introduction of intensive programmes like the IADP and Intensive Agricultural Area Programme (IAAP), the first signs of the inability of the structure to respond rapidly enough to the scientific changes became apparent. On the other side, though agriculture was an important development

programme under the control of the panchayat samiti and the zila parishad, with some exceptions, it was found that the problems of agriculture were too mundane to enthuse elected representatives. There were other sectors where performance could be immediately identified which naturally attracted elected representatives who had to depend on noticeable performance for their survival. A study carried out by the Commission in Maharashtra, which is the best representative of panchayati raj system, shows that even here not all the zila parishads were able to respond to the needs of scientific agriculture at the pace required. At the same time, theoretically, a mass programme can be better activated by elected representatives who control policy and supervise the performance than by a bureaucratic structure. We are of the view that depending upon the effectiveness and interest of the elected representatives in securing rapid agricultural growth, there can be two systems to choose from.

62.3.9 Firstly, where there is lack of interest of the elected representatives and where they are not effective, the present linking up of the field staff at the levels of village, panchayat samiti and the zila parishad with the elected bodies at these levels should be cut so as to provide a direct hierarchical control from the VLW to the District Officer. At the same time, in order to get the mass support which can be generated by the elected representatives even though they may not be completely responsive at these levels, the technical organisation should work in close association with the elected representatives though they may not be under their administrative control. In such cases, the respective State departments which are in technical control of the subjects will also have administrative control over the field organisation in the district.

62.3.10 Secondly, where the zila parishad is active and effective as in some districts of Maharashtra, the district field organization can be put under the control of the zila parishad. We feel that this should be done only in cases where the zila parishads are doing consistently good work in the sphere of agricultural development and the past record shows substantial achievements in this sphere. Even then, the link-up at the taluk/block and village level technical organisations with the corresponding panchayat samiti organisation and village panchayat, if any, will have to be severed so that there is a unified technical and administrative control only at the district level. We recommend that the States should, after a careful assessment as to the capacity of zila parishads under them, bring one of the two systems into operation to ensure effective application of science and technology in the field.

Growth of Institutional Support

62.3.11 The structure we have been discussing so far is for the technical expertise which can advise the farmer on his programme. Scientific agriculture requires timely and adequate credit, inputs and services also. Various institutions have been developed to deal with many problems arising out of these needs. The cooperative structure deals with credit and marketing. The land development bank finances and the Agricultural Refinance Development Corporation (ARC) refinances long-term funds for agricultural development. Agro-industries corporations have been formed for rendering services and supplies in machinery and other farm inputs. The commercial banks are coming up in a big way to support short, medium and long-term credit and to assist in the necessary custom services and marketing facilities in areas of rapid growth in production. Intensive agriculture leading to compact areas of development gives the necessary incentive to commercial organisations to develop the needed services. It can, therefore, be expected that more and more institutions of various kinds to support agriculture would develop. The technical departments are in-charge of extension, supervision, regulation and coordination of supplies and credit, but the institutions are becoming increasingly interested in actual supply of the requirements of the farmer. Therefore, unless there is close coordination between the working of these two sets of agencies, programmes will not get implemented within the time frame laid down. An important new aspect of district administration is thus emerging.

Coordination at the District Level

62.3.12 In the present set-up at the district level, there is no single organisation coordinating the work of the different district level offices under different Agricultural Departments and non-official agencies which are working independently and in isolation. Multiple offices for different fields of crop development and land improvement and soil conservation and other programmes with co-terminus jurisdiction make the task of coordination at the field level rather onerous. Duplication of work has been observed sometimes between the staff appointed under different schemes under the same department. There could also be similar types of schemes run concurrently by different departments resulting in overlapping and duplication of work. Departments of Minor Irrigation, State electricity boards and agro-industries corporations could all be connected with sinking of tubewells, grant of loans for the purpose and energisation and

maintenance. In the situation "There are too many parallel and vertical lines of control without any horizontal linkage resulting in a high degree of centralisation of powers at the head office."¹ In the animal husbandry sector also there are problems which need co-ordination at the district level particularly in States where separate directorates are in charge of animal production, animal health, dairying and sheep husbandry. Moreover, there is also the larger issue of coordination between departments dealing with agriculture, animal husbandry, fisheries and farm forestry etc. at the district level.

62.3.13 There has been steady growth of developmental staff at the district level under various departments and other official and non-official agencies. We have recommended the appointment of subject matter specialists at the taluk level; further as a result of advancement in different branches of agricultural science, the field services have acquired a highly specialised character and the requirements of specialists of calibre have also increased at the district and the block levels. Special staff are appointed under different schemes and there is no uniform pattern of staffing at this level. Moreover the growth of staff has not taken place in a planned manner and there are variations in the strength of the agricultural staff from district to district which cannot be justified in terms of potentiality for development in the district nor the magnitude of the effort already being put in. The subject-matter specialists are not of the required qualifications and have not been provided in some fields and in some districts such as the non-IADP districts or non-IAAP areas. The span of supervision and control also varies considerably between different specialists.

62.3.14 In the existing system, coordination among the agricultural development programmes is secured in most of the States through the District Collector who acts as the chairman of the district level coordination committee having varying nomenclatures in different States. In some States there is a whole-time official drawn from the generalist administrators of the rank of Additional Collector, who is entrusted with the work of coordination. In some others, this coordination is sought to be done through the District Development Assistant. There is also a multiplicity of coordinating committees at the district level. These have been constituted also for individual programmes, and sometimes an official committee presided over by the Collector and the agricultural production committee of the zila parishad exist side by side. The periodicity of the meetings of the district level coordination committees is not frequent enough

¹1974. Administration of the Department of Agriculture: Report 27, Madras, Administrative Reforms Commission, Govt. of Tamil Nadu.

and there is no arrangement for quick follow-up of the decisions taken by them. In the circumstances, the coordinating committees have not served their purpose. Thus there is no effective coordination among the district level agencies, staff under the agricultural university and credit and service institutions. There is also absence of any working plan at the district level for coordinating the activities of the different lending agencies in the public and private sectors. Experience has amply shown, that effective coordination cannot be secured mainly through overhead coordinating bodies or coordinators unless they are backed by an organisation which is involved in planning and is responsible for watching the progress. Coordination without involvement in the planning process which leads to the programmes is responsibility without control. Similarly, the coordinating agency must be able to relate the technical programmes with the required supplies and services.

Role of District Collector

62.3.15 There are some basic limitations with the Collector as a coordinator of agricultural development programmes. Apart from the fact that he is preoccupied with his other multifarious duties, the tenure of his office is also rather short. Even in Maharashtra, the Chief Executive Officer (CEO) of the zila parishad did not stay in one district, on an average, for more than one-and-a-half or two years. The Collector is more like a 'bird of passage' and has "limited chance of learning and appreciating the complexities of modernising agriculture"¹ and provide continuity in direction and coordination. Since the introduction of panchayati raj, the Collector has become still more of a general coordinator with little involvement in the actual administration of development programmes. The leader of the district level agricultural machinery has to be in the vortex of development continuously and should be fully conversant with the detailed operational work plan for the development of agriculture in the district. Each programme has to be broken into a set of task and sub-tasks and responsibility for each of these tasks has to be fixed on the appropriate functionary in accordance with a time-schedule. It is not possible for the District Collector to keep a detailed check on the progress of numerous programmes and attend to the administrative bottlenecks faced by them. His involvement in the development programme is limited to the disposal of work as it comes up in a routine manner so

¹1969. Modernising Indian Agriculture. Report on the Intensive Agricultural District Programme (1960-68) Vol. I, p. 39, New Delhi, Ministry of Agriculture, Govt. of India.

that the initiative in organising agricultural activities lies in actual practice with the district level technical officers under him who have limited discretion at their command. With this typical "executive" approach, the desired commitment to the success of the programmes cannot be achieved. Experience shows that team work among closely related technical departments can be secured through an officer who has the requisite understanding and sustained interest in the problems of these departments, and their inter-relationship. It is obvious that this kind of leadership can come from one of the agricultural departments only. A generalist administrator without technical knowledge cannot be in a position to take the initiative. A technical coordinator having both scientific knowledge and managerial skills would be better equipped to provide continuity in agricultural planning, influence the work content of the programmes and put the plans into action.

62.3.16 In this connection, it may be pointed out that the coordinating role of the District Collector differs in relation to officers of certain other departments like the Executive Engineers under the Public Works Department (PWD), Irrigation and Electricity. In many States the relationship between the Collector and the Executive Engineers of these departments is not the same as that between the officers of the Department of agriculture and the District Collector. The District Collector also does not have control over the non-official leadership of the cooperative structure which could ensure their complete involvement in the district development programmes. Similarly, supplies of agricultural machinery and inputs are not directly under the control of the Collector in many States. These cases show that the Collector is supposed to secure coordination between disparate groups of departments essentially through the qualities of leadership and persuasion without exercising administrative control. Therefore, coordination in the agricultural sector can best be achieved through a senior technical officer belonging to one of the agricultural disciplines. However, there might be occasions when coordination between one or more departments in the agricultural field with one or more departments outside the agricultural sector might become necessary. In such instances where only one or two departments are involved, the coordinating officer at the district level may himself get in touch with the other departments and settle the issues. When a number of departments are involved or in the case of emergency programmes, the Collector could provide the necessary link. The Collector should not have administrative control over the district officers in the various agricultural disciplines and should not be concerned with their detailed working. To depend, as at present, on the District Collector for every

little matter and to place every technical committee under him in the name of coordination is, in our view, not correct. We strongly recommend that for ensuring coordination, at the district level, there should be a Chief Agricultural Development Officer (CADO) in each district.

62.3.17 Removal of the cleavage in the line of control from the technical heads at the State level to those at the district and the block levels and appointment of a senior technical officer at the district level are, therefore, essential conditions of coordination in planning and execution of agricultural programmes at the field level. The main stress will be on securing coordination between extension, supply of inputs, credit and marketing and on providing appropriate supporting activities. As explained below, the objective of a coordinated field service can be achieved without affecting the unity of technical control in any way. There should be at the district level a District planning and coordination unit under the CADO for performing the planning and coordination functions. All the district level officers under the different departments will continue to function independently as at present under the respective departmental heads at the regional/State headquarters. This will ensure a direct line of administration from the State level downwards providing at the same time an efficient system of planning and watching the progress at the district level. The major fields that will be concerned at the district level are agriculture, animal husbandry, dairying, veterinary services, sheep husbandry, soil conservation, minor irrigation, fisheries, forestry (with regard to farm forestry) and cooperation. The district officers concerned with these subjects will be members of the district agricultural coordination council at the district level, as indicated in paragraph 62.3.24, under the leadership of the CADO. This council will be responsible for working out an integrated agricultural development plan in the district and keeping a watch on its progress. The district level specialists concerned with various disciplines should be members of the Council.

62.3.18 The team of subject-matter specialists will have to be adequately strengthened to include an agricultural economist and a farm management specialist. As recommended by us in our Interim Report on Some Aspects of Agricultural Research, Extension and Training, the specialists at the district level should preferably be holders of Ph. D. degree. However, the number and type of specialists would depend upon the problems of the district, its agroclimatic conditions and the priority of the different development programmes in the area. All units located at the district level, whether subject-matter or functional should be placed under the charge of respective district level

officers. Budget, finance, internal audit and establishment will continue to be under their respective district officers as at present. For facilitating coordination and consultations, all the different branches of the district level organisations may be located in the same building or on the same campus offering full opportunities for mutual discussion and exchange. The District Agricultural Coordination Council as proposed will facilitate constitution of multi-disciplinary consultative groups and support multi-disciplinary programmes and activities. In this system, all the existing services including tractor and plant protection units, soil-testing, farm advisory services, etc. will be available to different officers as and when required.

Planning, Coordination and Progress Analysis Unit at the District Level

62.3.19 The planning and coordination unit at the district level occupies the most important place among all the functional units. At present, the individual departments do not have any planning cells at the district level and, therefore, there is no planning and evaluation at that level in the true sense. The physical targets and financial allocation determined from above are disaggregated at the district level and, therefore, the objective of planning from below is not achieved. In the general planning units at the district level in some States, the district officers of the various departments do not play any significant role in plan-formulation. As observed by one of the State reports, "Very often, schemes are formulated at the level of Heads of Departments and thrust on the district officers for implementation." As a result, the required interest and commitment on the part of the district officers in the execution of schemes is lacking. Even where posts of District Statistical Officer or Economic and Statistical Investigator with supporting staff or Progress Assistant at the block level have been provided under the general set up, there is no attempt towards collection of the basic data essential for detailed agricultural planning at that level. Therefore, in our view, there should be a separate planning and coordination unit which should also deal with progress and evaluation. The unit should be distinct from the general planning set up at the district level. It will be the main tool for formulating action programmes for implementation and achieving coordination among various agencies connected with agricultural development. The unit should be equipped with trained staff including an agricultural eco-

¹ 1972. District Planning Machinery, Report by a Team of Senior Officers p. 22, Gandhinagar, Govt. of Gujarat.

nomist and a statistician with knowledge of agricultural economics and techniques of development planning.

62.3.20 The planning unit at the district level will be responsible for preparation of an integrated perspective, five year and annual plans for agricultural development of the district. The district plan has to be a detailed operational work plan. A basic report indentifying the resources, potentialities and possibilities of development will have to be prepared at the district level for each field or discipline which will constitute the basic framework within which the development programmes will be formulated. The planning unit in collaboration with the district level officers and other subject-matter specialists will be responsible for this and will collect all relevant data. It can project development needs including various inputs and services and make advance administrative and institutional planning for their proper synchronisation. It can be instrumental in spelling out and fixing responsibilities on the appropriate agencies and can help in identification of existing and likely administrative bottlenecks in the course of implementation through quick assessments of problems at the district level. There has to be continuous rapport between the planning units at the district and the State level so that the problems that need to be solved at the higher levels should be referred promptly to them.

Chief Agricultural Development Officer

62.3.21 The district planning unit should be under the CADO who should be a sufficiently senior officer belonging to any one of the disciplines like agriculture, animal husbandry, fisheries, forestry, co-operation, etc. The CADO will function as the principal co-ordinator of all agricultural activities at the district level. He will constitute the essential link for coordination not only between the officers in the fields of agriculture but also in relation to other departments, e.g., PWD, Electricity and Irrigation, the panchayati raj institutions and other autonomous bodies and institutions in the field of agricultural development. Considering that he will be concerned with widest and most significant areas of development in the district, the CADO should enjoy the status and authority necessary for commanding respect and for exercising coordination at the district level. His scale of pay should be higher than that of any one of the existing district level officers whose work he is required to coordinate. An added advantage of making the post of CADO attractive will be to facilitate the much needed reverse movement from senior posts at the State/di-

visional headquarters to the field. Much of the success of the agricultural development programmes in the district will depend upon the ability and qualities of leadership of the CADO and, therefore, he must be a carefully selected and trained officer. The selection of this officer should be made by a committee comprising the State level heads of all the concerned departments, presided over by the Agricultural Production Commissioner. For this purpose a list of all the eligible and competent officers from all the concerned departments should be prepared and a pool of officers selected by the selection committee should be made. It should be the endeavour to see that subject to eligibility and competence, the officers of the different departments are given their due share in the pool. The postings and transfers will also be done on the recommendations of the APC based on the advice of the same committee. Apart from being an expert in any one of the agricultural fields, the selected person should have sufficient knowledge and experience of agricultural planning, administration and management. The CADO should be in position in a district for sufficiently long time, say about 5 years so that he is able to comprehend the local conditions and problems fully.

Operational Freedom to Specialists

62.3.22 As already mentioned in paragraph 62.3.17, the district level specialists and developmental officers who will be in charge of different branches will continue to function under technical guidance of the concerned departments at the State level. Growing specialisation in different branches makes it incumbent that the identity of individual technical services and the lines of technical supervision and control from the superior to the lower levels of expertise are duly preserved. The CADO should not interfere with the technical work of the technical officers except what is required for the purpose of planning, coordination and progress evaluation. The post of CADO can be regarded as a technical post of administrative nature with planning and coordination as the main functions. He should be technically as well as administratively competent to tie up the different technical programmes within the total plan frame of the district and should take all necessary measures towards this end. However, his role which is essentially that of a planner and coordinator should not be mixed up with that of technical direction.

Administrative Relationships of Chief Agricultural Development Officer

62.3.23 To make the CADO effective and also to ensure that he

is treated by the other district officers as their senior, it will be necessary that the CADO will initiate the character rolls of the specialists and the other concerned technical officers at the district level but his entries should only be confined to matters relating to planning and coordination. The reports, may thereafter, be sent to the concerned senior technical officer in the hierarchy at the division or the State headquarters. The report of the CADO may be written by the APC in consultation with technical heads of other departments and corresponding organisations. In the system envisaged, the CADO will function under the administrative control of the APC.

District Agricultural Coordination Council

62.3.24 The planning unit should have strong links with non-official agencies and autonomous bodies operating in the field of agriculture such as cooperative institutions, the agricultural university, agro-industries corporation, the small and marginal farmers' and agricultural labourers development agencies, project officers in-charge of other special programmes including farmers' training, zila parishad, producers' or farmers' organisations, if any, and commercial banks etc. Hence we feel that there is need for constituting an agricultural coordination council at the district level under the chairmanship of the CADO on which these agencies would be suitably represented. The Council would be an advisory body and the follow-up action on its decisions will be the responsibility of the CADO and planning unit under him. The council should not be unwieldy and it could be supported by consultative groups for different areas of development under the CADO. Leadership and direction of the CADO will be an important factor in ensuring that the decisions of the council are not treated in a routine manner. However, in order to facilitate matters, the CADO could be associated with the management of the non-official bodies and autonomous agencies at the district level. With these changes in the organisational set-up and coordinating arrangements, the multiplicity of coordinating bodies as at present, will be avoided.

Administrative Set-up at the Block Level

62.3.25 We had recommended that a team of specialists should be located at the tehsil or taluk level. The team leader and the specialists should preferably be holder of M.Sc. degrees and should be placed in appropriate grades. For reasons already discussed while examining the role of the District Collector, the BDO is not in a posi-

tion to provide effective leadership in the execution of agricultural programmes which constitute only a part of his numerous responsibilities. We feel that there should be a BADO at the block level who would be directly responsible to the CADO at the district level and would have the same role of coordinator at the block level. The present BDO may continue but he should deal only with development in the non-agricultural sectors. The selection, appointment and administrative relationships of the BADO will be determined broadly on the same principles and considerations as in the case of the CADO. BADO also can belong to any one of the agricultural disciplines and departments, in the agricultural fields at the State level. His report will be written by the CADO in consultation with the specialists/development officers at the district level and forwarded to the next technical superior/technical head in his own line, for final assessment and countersignature. In the case of specialists or extension officers at the block level, the reports may be initiated by the BADO but his remarks should be confined only to matters relating to cooperation and referred to specialists or development officers in the line at the district level for review.

62.3.26 At the block level there should be a unit to watch the progress of agricultural development programmes in the block, under the BADO. This unit will maintain all the data relating to the progress of the programmes in the different subject matter fields within agriculture, and also other data relevant to agricultural planning. The unit will maintain close contact with the farmers service societies (FSS) and the activities organised under their auspices.

62.3.27 On the pattern of the agricultural coordination council at the district level, there should be a committee at the block level also which can be known as block agricultural coordination committee for coordinating the various programmes in the field of agriculture.

62.3.28 The existing agricultural staffing pattern at the block and village level in different States presents a varied picture. In the absence of standard norms and principles, there is sharp difference in the coverage, load of work, nature of duties allotted as well as pay-scales, grades and prospects in respect of the posts of AEOs and VLWs and other similar posts at the field level, from one State to another. Even though instructions have been issued that the VLWs should devote 80 to 100 per cent of their time to agriculture, it is rarely that they manage to devote more than half the time to agriculture. The jurisdiction of the VLWs and AEOs is too large and unmanageable. They suffer from duality of control under which they have to serve the BDO belonging to the administrative cadre and their techni-

cal superiors, but in actual practice have to abide by the instructions of the former. At present 20 VLWs have been provided for each block under the IADP. The experience of IADP shows that the minimum strength of VLWs required is one full-time VLW for about 300 farming families and one AEO for 4 VLWs at the current level of technology in a typical district. In the general pattern one VLW has to look after approximately 1000 to 1200 farming families spread over an area of about 2025 hectares. This means that the strength of the agricultural VLWs will have to be trebled if the extension work is to be done effectively. The strength of the AEOs will also have to be proportionately raised. In actual practice, the norms regarding the staffing pattern and the strength of extension workers would differ from areas under assured irrigation or rainfall as distinct from dry farming areas and from region to region. These should be worked out separately for different areas. Strengthening of the extension staff at the field level is also necessary because there is every likelihood of the services of a small number of extension workers and VLWs being utilised more by the rich and privileged farmers at the cost of the small and poor ones. However, in our view mere augmentation of the strength of the extension staff without an organisation located in close proximity to the farming community for assuring the package of complementary supplies and services will not go very far.

62.3.29 One of the major handicaps in the farmers' accessibility to inputs and other services is the distance between his field and the headquarters of the multiple official and non-official agencies which are to cater to his needs, the small and marginal farmers and the weaker sections being the particular sufferers in this regard. The organisation at the block level, though essential, will still be too large a unit for establishing the requisite rapport with the local people and secure coordination in day to day operations. On the other hand, the average population of the primary level panchayat having jurisdiction over a village or a group of villages is within the range of 2,000 to 2,500. A large number of these panchayats do not constitute viable units from the point of view of integrated development. In our Report on Some Aspects of Agricultural Research, Extension and Training we have recommended that the VLW should be provided better technical support at the next higher level, i.e., the AEO who may be located at a circle/hobli headquarters within a taluk (or block) with a population range of about 10,000. The object is that the AEO should be in the best position to contact the villagers and provide technical guidance to the VLWs. Manageable areas on this

principle will have to be located in those States where the circle system does not work.

62.3.30 We had while examining the question of organising credit services for small and marginal farmers and agricultural labourers recommended organisation of farmers' service society as a registered cooperative body which would cover a population of about 10,000 and would cater to all the developmental needs of the farmers within its jurisdiction. Though open to all farmers, the small and marginal farmers will have the dominant voice in its management. It would provide for short, medium and long term credit and the necessary inputs, services and marketing facilities through agency arrangements or directly, if necessary. However, a credit system by itself will be ineffective in the rural areas without an organisation of the extension service, inputs and marketing sectors. Therefore, the idea of an AEO at the circle level with adequate number of VLWs under him and that of FSS with the same population range recognise the need for provision of inputs, credit and technical know-how within the closest proximity of each individual farmer.

62.3.31 In the organisational scheme suggested above, the continuance of the VLW who is a general purpose factotum in the agricultural sector, as an essential link between the expert and farmer, is necessary and he should work as a last link in the chain of agricultural development devoting cent per cent of his time for agriculture. The VLW should not be burdened with office work so that he is able to spend most of his time with the farmers. As already mentioned in paragraph 62.3.4, eight out of the ten VLWs may be allotted to the agricultural work including crop production, water management, animal husbandry, fisheries and farm forestry. The non-agricultural development programmes can continue under the control of the BDO with the help of the other two VLWs and he can operate on these programmes with the assistance of the specialist staff like Extension Officers for Public health, social education, PWD, panchayati raj, etc. at the block level and panchayat secretaries at the village level. The field level staff of the Department of Animal Husbandry like Livestock Inspector, Stockman and Veterinary Compounders may continue to operate in their respective fields and be strengthened depending on the increasing needs of the area. In paragraph 62.4.32 we have pointed out the importance of women's programmes in rural development. In order that these programmes are carried out effectively it will be necessary to have trained Gram Sevikas for educating the farm women in the new skills and practices necessary for providing them gainful employment and improving their living conditions.

4 STATE LEVEL ORGANISATION

Coordination at Secretariat Level

62.4.1 At the State level, matters relating to agricultural development are handled at present in several secretariat departments, the number and grouping of subjects handled by each varying considerably from State to State. Generally, the following six major groups of subjects are handled by different departments :

agriculture

- (i) crop production
- (ii) minor irrigation
- (iii) soil conservation
- (iv) horticulture
- (v) plant protection
- (vi) marketing
- (vii) research
- (viii) extension

animal husbandry

- (i) animal husbandry
- (ii) dairy development
- (iii) animal health
- (iv) sheep husbandry

fisheries

- (i) inland
- (ii) marine

forestry

cooperation

rural development

- (i) community development
- (ii) panchayati raj

For handling technical matters, there are several directorates, each in charge of a Director who is also the Head of the Department. The number and the subjects handled by each varies from State to State. In the case of forestry, the Head of the Department is the Chief Conservator of Forests, and for cooperation it is the Registrar of Cooperative Societies. In some States, the chief of dairy development is designated as Dairy Development/Milk Commissioner.

62.4.2 To ensure a balanced and all-round development of agriculture in the State, appropriate administrative arrangements are necessary for planning, directing, guiding, coordinating and watching the progress of development in the State. The Ram Subhag Singh

Committee recommended that there should be an integrated Department of Agriculture and Rural Development at the secretariat level comprising agriculture*, animal husbandry, fisheries, community development and panchayati raj, cooperation and allied departments. The integrated Department was to be headed by a senior officer to be designated as Secretary-cum-Commissioner (Agricultural Production and Rural Development), who was to be assisted by Additional and/or Joint Secretaries as necessary. The Secretary-cum-Commissioner (Agricultural Production and Rural Development) was to be responsible for coordinating the work of Heads of Departments concerned with agricultural production such as Directors of Agriculture, Animal Husbandry, Fisheries and Panchayati Raj and Registrar of Cooperative Societies. The post of APC has been created in a number of States but an integrated Department of Agriculture and Rural Development at the secretariat level, as conceived by the Ram Subhag Singh Committee, has been set up only in a few States.

62.4.3 In section 3 of this chapter it has been pointed out that as science develops and growth is intensified, agriculture, animal husbandry, fisheries and forestry will have to build up their own lines of expertise from the primary field level upwards. This postulates that technical hierarchy upto the State level will be developing in course of time in all the disciplines. The need for coordination at various levels in both formulation of programmes and implementation in the field has been emphasised. This need becomes greater at the State level. The recommendations of the Ram Subhag Singh Committee which were made before the introduction of the new strategy for agricultural development have become all the more relevant today with the intensification of the pace of development in all the sectors. We have considered very carefully these recommendations but feel that the setting up of an integrated Department of Agriculture at the State level in which the secretariat work in respect of all the subject matter fields referred to earlier in this section are to be brought under one department might present some difficulties, particularly in the larger States. Firstly, the work will become too unwieldy to be efficiently managed by a single secretariat. Secondly, the types and degrees of coordination needed would differ within and between broad fields of crop production, animal husbandry, fisheries and forestry and integration of all these subjects into one secretariat department might not be necessary provided adequate arrangements for coordination are made. We feel that there is need for greater

*Including cane cultivation and minor irrigation included in agriculturande community development.

coordination within each of these subject-matter fields and hence there is need for having separate secretariat departments at least for crop production, animal husbandry, fisheries and forestry, in all the major States. The actual number of departments will depend upon the importance of the different subject in the State, the workload in each subjects, etc. Depending upon these considerations two or more subjects can be brought together in a single department where necessary.

62.4.4 At the same time, there is need for having a single officer of the status of Agricultural Production Commissioner-cum-Principal Secretary to the Government to plan, direct, guide and coordinate the various subjects within agriculture and we strongly recommend that those States where the APC has not been appointed should take immediate steps for appointing one. The APC need not, however, be responsible for routine secretariat work in all the fields but should deal only with the following functions:

- (i) programme planning
- (ii) progress and evaluation
- (iii) overall budget control
- (iv) coordination
- (v) liaison with Centre.

He should have the necessary secretariat units for each of these subjects under him with properly qualified staff. He could have a separate secretariat and he should be in rank only next to the Chief Secretary of the State. All important policy matters in the sphere of agricultural development should pass through him to the Cabinet Minister in charge of agriculture and he should be empowered to take decisions on all major policy issues in the sphere of agriculture.

Coordinating Arrangements at Minister's Level

62.4.5 The arrangements for distribution of portfolios at the level of Ministers in the States are not uniform. At present, several Ministers, some of Cabinet rank and some of the rank of Minister of State, handle one or more of the subjects listed in paragraph 62.4.1. In some States, even related subjects, *e.g.*, animal husbandry and dairy development are handled by different Ministers and subjects which are not related, *e.g.*, fisheries and forestry are placed under one Minister. Further, in some States, coordination between the different subjects at the Minister's level is sought to be done through a Cabinet Committee on Agricultural Production, generally presided over by the Chief Minister. This arrangement has, however, not worked in

practice in several States. The meetings of the Cabinet Sub-Committee are not frequent enough. In our view, the best arrangement would be to entrust a senior Cabinet Minister with the overall responsibility for all the subjects in the sphere of agricultural development such as agriculture, animal husbandry, fisheries, forestry, cooperation and rural development, to provide unified policy and direction for agricultural development. He should preferably be a Deputy Chief Minister in the State cabinet. For handling different subjects, there could be Ministers of State in charge of different departments, the number and the grouping of subjects depending on the workload, their inter-relationship, etc. It may be recalled that some years ago, the late Prime Minister of India, Shri Jawaharlal Nehru, had advised the Chief Ministers of the States to take over agriculture portfolio in view of the importance of agriculture in the national economy. We consider that the Cabinet Minister in-charge of agriculture should be of the level of Deputy Chief Minister because the work of agricultural development would have a bearing on the activities of other departments in charge of different Ministers and, therefore, the Minister in-charge of agriculture should be able to command respect and support from his other Cabinet colleagues dealing with these subjects. We are conscious that division of portfolios among Ministers in a democratic system depends upon many factors which are not amenable to strict administrative consideration, though competence to administer is a basic necessity. At the same time, the compulsions of the situation demand the unification of policy-making at the Minister's level under the Deputy Chief Minister. The needs of political exigencies will be taken care of if separate departments for crop production, animal husbandry, etc. are placed under the charge of Ministers of State depending on the volume of work, inter-relationship of different subjects, etc. Experience of States where different subjects are under different Ministers indicates that even when the secretaries are common, unified policy-making becomes difficult. Where the secretaries are also different, the problems get much more complicated. Thus, by having APC as a super coordinating officer in respect of all agricultural development matters at the secretariat level and having Cabinet Minister in-charge of agriculture in the rank of Deputy Chief Minister, it would help to secure the objective of rapid agricultural development in the country.

Technical Directorates

62.4.6 The necessity of having separate directorates for agricul-

ture, animal husbandry and fisheries is obvious. The position regarding the number of directorates and the subjects handled by them varies from State to State. Depending upon the volume of work and the spread of development, directorates have also been created for soil conservation, marketing, horticulture, etc. in agriculture. In animal husbandry, separate directorates have been created for animal health, dairying, animal husbandry and sheep husbandry in some States. In some others it may be necessary ultimately to have separate directorates for inland and marine fisheries. A multiplicity of directorates creates problems of coordination, and there must be adequate arrangements for ensuring such coordination. Thus, where there are several directorates in the sub-sectors relating to agriculture/animal husbandry, the senior-most Director should be designated as the Director-in-chief and be entrusted with the responsibilities at the State headquarters for coordination. Similar arrangements should be made for fisheries where there are separate directorates for inland and marine fisheries.

62.4.7 Besides, there is also a need for a separate Directorate of Extension. Extension is at present handled at the State level as a part of the normal duties of the Directorate of Agriculture. The vocational training programmes are also dealt with directly by the Directorate of Agriculture. There are no extension or training programmes as such for the other disciplines of agriculture like animal husbandry, fisheries and forestry. It is, therefore, necessary to have a technical directorate for extension and training at the State headquarters. As the extension work will be conducted for all the disciplines of agriculture, it is necessary that this directorate be placed under the APC. A machinery for mutual consultation, evaluation and coordination between the different departments/executive directorates and the Directorate of Extension has to be established. A committee chaired by the APC and involving all the technical heads including the head of the Extension Directorate should be able to look into this problem. This committee should meet at least once a quarter to lay down the programme of action for all concerned and periodically check performance. The Directorate of Extension should function as a secretariat for this committee. It can also function as a secretariat for the proposed joint specialists' council at the State level for coordination between research and development. The Directorate of Extension at the State level should also deal with women's programme. There should, therefore, be a full-fledged division in this directorate to take charge of women's programmes which could in due course be designated as Directorate of Women's Programmes. This unit will be responsible for formulation

and execution of a comprehensive programmes for rural women and children.

Planning Unit

62.4.8 In the present set-up there is no separate organisation for planning, coordination and evaluation in the field of agriculture. There are no arrangements for preparation of an integrated development plan for the agricultural sector as a whole. We, therefore, recommend that there should be a separate unit for planning, coordination and evaluation under the APC. A basic advantage of such a separate unit for agriculture is that through it planning and implementation are brought to bear upon each other. In the existing system of a separate omnibus planning organisation at the State level, the agricultural departments are not fully involved in the planning process and the problems associated with implementation of programmes are not properly recognised. For instance, the inter-departmental adjustments in the plan ceilings within the agricultural sector also are done by the State Planning Department. These should lie within APC's discretion. The planning and coordination unit for agriculture, will have a multi-level structure enabling a two-way traffic in planning, policy formulation and decision making between the planning units at the State level and the counterpart organisations at the field level. It will be possible through these planning units to formulate the development programmes on the basis of an integrated assessment of resource position, physical as well as financial. The State level units will act as the guide for the district and block level units and field officers at the district level in different disciplines, the subject-matter specialists and other field agencies and will in turn be fed back by them with the latest information regarding the progress of development schemes.

62.4.9 The planning unit which will also deal with coordination and evaluation should be headed by a senior officer having the required qualifications and background and should be placed directly under the APC. The unit will be the main instrument with the APC for coordinating the activities of the different secretariat departments, technical directorates and other organisations effectively. At the secretariat level, there is absence at present of the requisite expertise which could provide proper guidance to the planning efforts, by the technical directorates and other agricultural agencies. There are also no arrangements for integrated reviews of progress of development programmes in the agricultural sector. The unit under the APC will be the focal point where all sectoral projects and programmes will be coordinated and brought into harmony with the goals of an integrated

agricultural development plan. Preparation of technical programmes will continue to be the responsibility of each technical directorate or concerned implementing agency and the planning unit under the APC will ensure that the programmes worked out by these agencies are tied up within the conception of a unified plan and budget. The unit may consist of three wings: (a) a planning wing concerned with interdisciplinary planning, general policy questions and preparation of an integrated plan for the agricultural sector as a whole, (b) an administrative coordination wing and (c) an evaluation wing concerned essentially with concurrent evaluation with a view to presenting a total picture of progress in the agricultural sector and making an appraisal of the problems of overall or inter-sectoral importance. Evaluation of long-term nature as distinct from concurrent appraisals may be entrusted to an outside body like the agricultural university, research institutes and other similar autonomous bodies. The planning unit should be supported by well-trained economic and statistical staff. In this way, the planning unit under the APC will facilitate decision-making on basic policy issues as well as questions affecting two or more agricultural departments or directorates or agencies in course of implementation. With the introduction of this unit under the APC, it will also be possible to do away with a large number of coordinating bodies set up on inter-departmental, sectoral or programme-wise basis and have a total view of the administrative system. The level of expertise in the unit should be adequately high.

62.4.10 The planning unit under the APC should not become an operational division in the sense that specific issues relating to sectoral programmes should continue to be dealt with by the concerned integrated directorate or department. It should, therefore, function as a unifying link rather than a super-division. The planning unit must work in close harmony with the budget and finance unit.

Planning Cells in the Technical Directorates

62.4.11 In addition to planning unit under the APC at the secretarial level, strong planning, coordination and progress analysis cells will have to be organised under the different integrated directorates. The existing planning units in the technical directorates are totally ill-equipped with the result that plans are ill-prepared causing delay in their finalisation and sanction. The planning cells under the technical directorates will be responsible for collection of basic data fixing of priorities, targets, preparation of projects and time-schedule of work, progress analysis and concurrent evaluation, moni-

toring and deciding the detailed action programme for implementation in regard to the sector of development under the purview of a particular department/directorate. It will be the responsibility of these planning cells to ensure that decisions on priorities, targets, time-schedule of work and action programme are precisely spelt out and communicated to the district level officers and other field agencies speedily and in proper form. There will be no duplication between the planning units under the APC and those at the level of directorates, because the latter will be concerned with detailed planning for the sector under their purview. The cell in the directorates can be organised on the same lines as the planning unit at the secretariat level and will function within the total framework and guidelines laid down by the latter. As in the case of the planning unit at the secretariat level, the planning cells in the directorates will function in close harmony with budgetary cells in the directorates.

Budget Control Unit

62.4.12 There should be a budget control unit under the APC to have overall supervision over utilisation of the budget provisions and for taking steps to divert funds in time from one head to another within the overall budget for agriculture. This unit should not try to do the basic work of budget control which the secretariat departments and executive directorates must deal with. Each department/directorate must have its own budget cell which should be responsible for the detailed budget control in the disciplines under the department/directorate.

62.4.13 The individual secretariat departments in charge of crop production, animal husbandry, fishery, forestry, cooperation and rural development, or a combination of these subjects will in general, deal with the following items in their respective fields:

- (i) policy matters,
- (ii) issue of sanctions of schemes,
- (iii) regulatory functions,
- (iv) legislative matters,
- (v) departmental budgets,
- (vi) coordination of input, credit and marketing,
- (vii) coordination between research and development,
- (viii) training and manpower, and
- (ix) establishment and personnel.

Inputs, Credit and Other Units

62.4.14 The inputs, credit and marketing, manpower planning

and training units in the secretariat departments should deal with the policy in the individual sectors and ensure coordination at the State level between the department and the institutions concerned so as to actively support the executive directorates under the department.

Coordination between Research and Development

62.4.15 Judging from the point of view of functional compatibility, the State agricultural organisation suffers from a number of other lacunae that deserve specific mention. Even now basic and applied research has not been completely transferred from the Agriculture Departments to the agricultural universities in some cases, resulting in duality of control and diffusion of responsibility in an area of crucial importance to agricultural growth. Moreover, there is an unfortunate tendency on the part of the agricultural universities to work in isolation and in circumstances divorced from the real problems arising in the field. There is also lack of co-ordination between the subject-matter specialist, working in the districts under the agricultural universities and the district level agricultural staff under the Government because there is no allotment of separate jurisdiction for them. As recommended by us in our Interim Report on Some Aspects of Agricultural Research, Extension and Training the State departments should be fully responsible for the entire field of extension functions in the States, except for a limited involvement of research scientists with extension on the farmers' field in the nature of demonstrations and intensive programmes.

62.4.16 However, in order that the group of subject-matter specialists under the Departments of Agriculture, Animal Husbandry and Fisheries at the State as well as the district level are on the highest calibre, they have to be in touch with the main stream of research. It is, therefore, desirable to form joint specialists' councils at the State level under the respective Departments of Agriculture, Animal Husbandry, Forestry, Fisheries etc. comprising the subject-matter specialists under the department and the top level subject-matter experts in the various faculties in the agricultural university in the State. The joint councils may make periodical assessment of the state of science in the light of field requirements. All technical matters having policy implications may be discussed in this forum and their views duly considered before Government is advised on such policy questions. In order that the heads of technical directorates are supported by a highly competent team of subject-matter programme and extension specialists, the contact

between them and the specialists in the university divisions has to be continuous. As recommended by us in our Interim Report on Some Aspects of Agricultural Research, Extension and Training, in order to maintain technical competence in State departments, provision should be made for exchange of staff at appropriate level between the universities and departments on deputation basis. It might be added that making the development organisation fully responsible for adaptive research does not mean that the administrator should have a hand in interfering in the research field. Adaptive research is really meant to be application of the research findings to local conditions. Further, the personnel in the departmental set-up at various levels should have basic qualifications equivalent to the various levels of personnel in the research and education wings of the agricultural universities. There could also be adaptive research cells at the level of technical directorates which could function in close liaison with the agricultural universities.

Supply Functions

62.4.17 To turn to another aspect, the Departments of Agriculture, Animal Husbandry and Fisheries are still associated with supplies and service functions in a number of State*. In some cases supplies are being made through the extension officers. Combination of extension and supply functions in the department is bound to affect adversely the extension function because these need concentrated efforts and expertise of high calibre. Supply and service functions should be more appropriately entrusted to institutional agencies and other alternative systems of supplies outside the departmental purview. The department will not be concerned with distribution of supplies. But it will be responsible for proper coordination of the agencies concerned with the organisation of supplies and related services so that these are available in a synchronised manner. The inputs unit in the department will be responsible for input planning including preparation of an estimate of demand and supply for the whole State covering different sectors of development. It should be their specific responsibility to ensure that the supplies of appropriate quality reach the farmers in time and in adequate quantities.

Regulatory Functions

62.4.18 With the transfer of research and supply functions the

*For instance, Andhra Pradesh, Maharashtra, Tamil Nadu, Uttar Pradesh, Haryana, Himachal Pradesh etc. In Tamil Nadu Department of Agriculture has perhaps the largest trading turnover among the State Government departments.

main stress of the activities of the department will be on policy-making and deciding the strategy of implementation. It will be concerned primarily with development, extension and regulatory functions. The regulatory functions and quality control will cover marketing, processing, consumption, regulation of seed varieties and their purity, fertiliser grades, insecticide standards, drugs, vaccine, animal feed, etc. However, we endorse the view that "the regular extension staff of the department attending to development and promotional work should not be asked to attend to the regulatory work...." and separate wing with supporting staff at different levels within the organisational framework will be necessary for this purpose.¹

Absence of a Rational Staffing Pattern

62.4.19 In the internal staffing structure in the case of existing departments and directorates, it was observed that the strength and pattern of staffing including senior technical posts were linked with individual plan schemes and were not determined by any systematic plan for strengthening the administrative structure keeping in view the needs of agricultural development of the State as a whole. For example, the staff under the Central or Centrally sponsored schemes which are to be implemented by the States, is sanctioned on an earmarked basis. There were cases wherein subject-matter specialists were not appointed under certain programmes or disciplines whereas in others there was duplication of technical staff. In many cases, the strength of qualified and trained officers was inadequate and not evenly spread out. The need for building a stable cadre under the departments need not be over-emphasised. What is required is to take a total and long-term view of the additional requirements of developmental staff and build the cadres accordingly.

Divisional Level of Administration

62.4.20 Taking the vertical structure, in most States, there is a divisional level of administration between the district and the State headquarters. A divisional or regional level of development administration has been defended in recognition of the separate entity of agro-climatic zones in a State. In actual practice, however, not only a region but even a district may be heterogeneous in

¹ 1974 Report: 27: Administration of the Department of Agriculture, Administrative Reforms Commission, Madras, Govt. of Tamil Nadu.

the development potential and the agro-climatic differences within a district can be more significant from the point of view of detailed and operative policy and programme formulation. The administrative structure has accordingly to be more and more oriented towards local direction of agricultural programmes and the number of hierarchies between the field and State headquarters should be minimum so that the lines of technical control and guidance are not warped. The line of command from the State to the district should be direct. The divisional level should be justified only in the case of large States with a very large number of districts and regional homogeneity such as Uttar Pradesh, Madhya Pradesh or Maharashtra. The divisional level, in these cases can take a unified view of common regional problems. Such cases, however, should be exceptional. Even where divisional level is introduced, its functions should be limited to regional planning and coordination. It should not become another layer of administration or a routine channel for every decision or communication, and its interference in the working of the district agricultural organisation should be minimal.

Concentration of Posts at the Headquarters

62.4.21 It has been observed that the administrative structure of the Agricultural Departments is top heavy in the sense that there is concentration of higher posts at the State or divisional headquarters. Existence of a number of isolated special hierarchies which are coordinated only at the State level has also resulted in centralisation of decision-making and creation of a sprawling and unwieldy headquarters organisation. In a system in which higher posts are concentrated at the divisional level or State headquarters, every small matter has to be referred to the secretariat head for decision and the technical heads will not be able to function effectively in the field. In the set-up envisaged by us, secretariat or State headquarters organisation will be comparatively small and compact by due decentralisation of authority to the field level organisation.

Grant of Secretariat Status to Technical Officers

62.4.22 The relationship between the technical heads of directorates and the secretariat department also needs to be restructured. Due to concentration of powers at the secretariat level, the heads of technical directorates have to approach the Government

for sanction even in respect of relatively minor matters. The procedure under which the proposals are examined in the first instance in the directorate and then at the secretariat level is a source of undue delay and dilution of responsibilities. This also increases the load of desk work. Moreover, in the existing system, examination of proposals and decision-making at the secretariat level are initiated in actual practice, from the lower levels, making no contribution from the technical angle. Various solutions have been suggested in this connection such as (a) integration of the headquarters organisation of the executive departments with the State secretariat and allowing the heads of executive agencies to function as principal advisers to the Government in their respective areas with suitable status¹, (b) grant of *ex-officio* secretariat status to the technical heads, and/or (c) sanction of widest possible powers to the technical heads of the executive departments so that decision-making is decentralised.

62.4.23 The issue has to be looked at from the wider perspective of providing the required status and incentive to the technical personnel and a suitable place has to be given to them in the decision-making process at the secretariat level. The technical officers should also be managers of agricultural programmes. There is no gainsaying that decision-making on technical matters will be qualitatively improved through the participation of technical experts. In the present system, the technical experts, deprived of key positions of decision-making, are not able to develop and utilise their full potential in the field of agricultural development administration.

62.4.24 Top management posts in the secretariat including those of Secretaries and Joint Secretaries should be held by the technical officers of the various directorates and executive departments. The post of APC should be filled from among the Secretaries of the departments. A technical officer should be preferred for this post. However, we are conscious of the fact that straightway it may not be possible to find a technical person with the requisite administrative and managerial experience to fill up this important post in all the States. Wherever such a qualified technical person is available, the post should go to him. Otherwise, a generalist administrator with aptitude and experience in agricultural administration should be appointed to the post. The reason why technical persons in sufficient numbers may not be available to man such posts is that under the present set-up in the administration of the technical departments, technical persons have been left out of the mainstream of administration. It will have to be admitted that administration

¹1959. Report on State Administration, Administrative Reforms Commission ¶ 34 (Recommendation 14). New Delhi, Government of India.

of technical departments needs experience and expertise in administration. It will, therefore, be necessary to groom the technical officers eligible for holding these posts by virtue of their seniority and technical capabilities, in administration. This process of training future technical administrators should be initiated immediately so that within 10 years at the latest, there should be no difficulty in having technical officers in sufficient number with requisite administrative experience to hold the highest post.

62.4.25 The individual secretariat departments covering one or more agricultural fields as indicated in paragraph 62.3.3 should be headed by Secretaries. As in the case of APC, we recommend that the technical officers should be appointed as Secretaries of these departments in all the States at the latest by 1980. Position with regard to the availability of persons with requisite experience to man the posts of Secretaries of departments is, in our view, better than that in the case of APC.

62.4.26 Similarly, technical officers should be provided the maximum opportunity for manning other senior positions of management in agricultural development corporations, agencies, boards, etc. With the increasing complexity of modern agriculture and its management, it is only natural that posts connected with the administration of agricultural development should be filled by officers who are eligible by virtue of their expert knowledge, specialisation and practical experience and who have stake in the long-term progress of agriculture and can make a career of it. The apprehension that placing the experts in administrative posts will affect their specialist functions is unfounded because despite getting into senior managerial or secretariat posts, a particular officer will continue to be an expert in his own line and will be keeping himself in touch with field conditions so that he is abreast with the fast changing technology and the problems of development.

62.4.27 Induction of technical officers into managerial posts at the secretariat level will itself lead to much better communication and understanding between the heads of technical directorates and the secretariat. However, to facilitate quicker decisions, the heads of technical directorates can be granted suitable *ex-officio* secretariat status. The purpose is not to burden the technical head with secretariat duties because his first and foremost function should be that of the technical guide, but to authorise him to issue sanctions on behalf of the Government and render technical advice to the Minister direct when required. The process can be further expedited through a single file system between the technical directorates and the secretariat. This will avoid duplication in examination of

proposals and restore oneness of Government. Another advantage of this system is that while disposing of a case the Minister or the APC will have access to technical opinion and not only the view of the secretariat.

Generalists in Technical Posts

62.4.28 While stressing the need for utilising the potential of technical officers in the posts connected with agricultural administration and management, we would like to refer specifically to the present anomalous position in which a large number of posts of technical nature such as Directors of Agriculture, Animal Husbandry, Fisheries, etc. are held by officers belonging to administrative cadres. Under this arrangement, the highest level of technical functionary in the State will be a comparatively junior officer at the level of Joint Director or Deputy Director and the Director will function only like a secretariat officer. This will also entail frequent changes in the incumbents of the post of Directors. There is, as such, no justification for placing administrators as the heads of technical directorates which are expected to be the main source of technical control and guidance in the connected fields. In order to remove any ambiguity in this regard, these directorates could be specifically declared as technical organisations and a provision to the effect that these posts should be held by technical officers alone be incorporated in the recruitment rules.

Improvement of Pay Scales

62.4.29 The technical cadres in agriculture have been treated in many States as the poor relations by other administrative cadres and their grades of pay and relative importance in the bureaucratic structure remain the lowest. Because of this, these cadres do not attract the best brains and as a result these services are not manned by persons of the required calibre to serve this important sector on which the future of the economy depends. There are, however, honourable exceptions. Another result of this pay scale and status difference between various State administrative cadres and the Central administrative posts is that it creates the basic problem of inter-changeability. Inter-changeability in agriculture is most necessary if the technical cadres are to take an all-India view of the problems of the country. Because of the difference in pay scales, the Central posts are rarely filled by experts from some of the States

where the grades of pay are generally poor. The difference in the scales of pay also leads to difficulties in borrowing expertise by one State from another in order to fill up temporary gaps in competence to hold high administrative posts. In the Interim Report on Some Aspects of Agricultural Research, Extension and Training we have recommended that there should be inter-changeability between the departmental technical staff and the university faculty. This recommendation has generally been accepted and several States have started implementing it. The agricultural universities coming under the coordinated guidance of the ICAR are unifying the scales of pay generally at a fairly high level. If the administrative wing does not similarly have a unified wage policy in all the States, though the intention to inter-change posts between the department and the university may be there, in practice it may not be possible. We would suggest that all States should follow uniform pay scales and prospects for the agricultural cadres and the pay scales and prospects should be comparable to those in the administrative service.

62.4.30 We would also suggest that all Central technical posts should generally be filled by deputation from the States and in filling up these posts the pay scales that the incumbents get in the various States should not be the criterion. Their position in the cadre and their competence should be taken into account while making the selections.

All India Agricultural Service

62.4.31 A strong agricultural administration can be developed in the country if an All-India Agricultural Service is formed in which the technical officers at the Centre as well as in the States at the level of Class I and above are encadred. The All-India Service will not only carry with it the prestige and status but will also improve the promotion prospects and conditions of service of the incumbents. It will give the necessary confidence to the personnel of the Service which is so essential for discharging the responsibility which the technical officers will be required to undertake in future. There is a climate of mistrust and disaffection between the generalist administrator and the technical personnel because of their varying career prospects. Once the technical officers belong to an all-India cadre, their relationship with administrative cadres will improve. It may be recalled that prior to the Government of India Act of 1935, Imperial/Indian Services were in existence in the spheres of agriculture, veterinary and forestry. The Indian Agricultural Service and Indian Veterinary Service were abolished in 1925 and the Indian

Forest Service after 1936 and these services were gradually wasted out. The Indian Forest Service was in existence till recently and the last IFS officer retired in 1964. These services attracted highly competent persons and there was no problem of any lack of understanding or mistrust between them and the ICS or other All-India Services at that time. Every officer worked within his own sphere and in harmonious collaboration with the officers of the other services.

62.4.32 The problem of agricultural development is a national problem and has to be tackled on that plane. The need for an All-India Service is much more now than ever before. In the British regime maintenance of law and order was the most important consideration in administration; now welfare and development are the main goals. It is, therefore, essential that the attraction of pay scales, prestige, promotion prospects and service conditions should draw the best talent in the development administration. We also suggest in this context that pay scales of all the administrative and technical services should be on par so that the choice of the candidate of the career is guided more by his inclination and aptitude rather than by allurements of pay scales and prestige of the different services.

62.4.33 It is pointed out that agriculture is a State subject and that technical officers in the sphere of agricultural development should be from the local areas so that they are fully conversant with the problems of the areas and the agro-climatic regions from which they come. It is, however, argued that no advantage is gained by an All-India Service where officers are inter-changeable. During our visits to the States we found that some of the State Governments were not in favour of an All-India Agricultural Service for this reason. In our view, the issue relating to familiarity with the area and knowledge of agricultural conditions can be taken care of by State Agricultural Services, junior and senior and there could be provision for inducting competent persons from the senior State service to the All-India Service on a quota basis. The All-India Service provides to the competent and talented members of the State services an opportunity to widen their experience and horizons and also improve their career prospects. Besides, the All-India Agricultural Service would provide a convenient channel through which technically qualified people who might be available in adequate numbers in a few States could be made available to other States lacking in expertise, of high quality. The All-India Service in such a situation would also eliminate the fear of dominance by outsiders which would otherwise naturally arise when an occasion of drafting in officers from outside a State would come.

62.4.34 Considering the importance of rapid development of agriculture in this country and the contribution which the All-India Service

could make to such development, we hope that all the States would agree to the constitution of the All India Agricultural Service. We strongly recommend that the All India Agricultural Service should be formed immediately. This Service should have different wings dealing with agriculture, animal husbandry and fisheries. There is already an Indian Forest Service which was formed in 1966. The Agricultural Research Service has already been formed and for the present, it consists of persons working in the ICAR and the research institutes administered by it. States are not participating in the Service. In pursuance of the recommendations made in our Interim Report on Some Aspects of Agricultural Research, Extension and Training, basic and applied research at the State level is the responsibility of universities and perhaps there may be no advantage in bringing the States in the Agricultural Research Service. The scientists dealing with adaptive research in the States could however, be inducted into the State Agricultural Services or the All India Agricultural Service depending on their competence and position occupied by them.

Agricultural and Rural Development Council

62.4.35 For ensuring coordination at the highest level, there may be an agricultural and rural development Council which may be set up at the State level under the chairmanship of Chief Minister/Deputy Chief Minister. The council will be responsible for approving the State plan; will consider the basic approaches and policy issues and review the general progress of the plan. It will be an advisory body and may consist of the APC, Secretaries of the concerned departments, the heads of technical directorates and executive bodies in the agricultural sector, Vice-Chancellor and Directors of Research and Extension wings of the agricultural university, representatives of agricultural development corporations, recognised agricultural institutions, cooperative and panchayati raj institutions and farmers' or producers' organisations, if any, and other scientists of repute and non-officials including selected representatives of farmers. Heads of other allied departments could also be associated with the deliberations of the council wherever necessary. The APC may act as the secretary of the council. The council will be supported in actual working by the planning, coordination and evaluation unit under the APC. It will be different from one or more of the commodity development councils that a State may decide to set up in the interest of better coordination in development and marketing of a specific crop or a group of commodities.¹ In order that there is coherence in the working of the vari-

¹1973 Interim Report, Organisation and Functions of the Commodity Development Councils and Directorates. National Commission on Agriculture, pp. 17-18.

ous councils, it is desirable that the commodity development councils and the joint specialists' council are suitably represented on the agricultural development council.

Farmers' Organisations

62.4.36 Farmers' organisation whether formal or informal can also demand and get service from the supplies of input and custom services. Fertilisers companies, pesticide organisations, land development banks and the Agricultural Refinance and Development Corporation (ARC) are all interested in seeing that the farmer improves his production. Commercial banks, land development banks and the ARC should also be interested in the productivity aspect. These institutions are already investing in the necessary expertise to teach the farmers to get productivity out of his land. With viable farmers' organisations, institutions will link themselves up with these organisations directly for their needs instead of the farmers having to go through a Government Extension Organisation.

62.4.37 A State organisation, however efficient, has its limitations. If the ultimate objective is intensive and rapid growth of the entire field of agriculture in the country, dependence purely on a governmental structure is not desirable. More and more farmers' organisations should be created and made effective so that farmers can take the responsibility for growth in their own hands. Government will then act as an adviser and a general supervisor to ensure the development.

5 CENTRAL AGRICULTURAL SET-UP

Expansion of the Central Agricultural Set-up

62.5.1 The Central Department of Agriculture came into existence in 1871, before the establishment of the Provincial Agricultural Departments. The Department of Revenue, Agriculture and Commerce of the Government of India functioned between 1871 and 1878. A new Central Department of Revenue and Agriculture was set up in 1881. Provincial Agriculture Departments were organised in most of the Provinces on the basis of the recommendations of the Famine Commission, 1880. In 1901, the post of Agricultural Chemist was replaced by an Inspector General of Agriculture who was to work in an advisory capacity both in relation to the Govern-

ment of India as well as to the local Governments. Following Lord Curzon's reforms in 1903, full-time Directors of Agriculture were appointed in all the major Provinces and an all-India Agricultural Service was constituted in 1906. After the Constitutional Reforms, 1919, responsibilities in the spheres of agriculture, veterinary, co-operation, forest and irrigation were devolved in the Provincial Governments. A separate Food Department was set up at the Centre in December, 1942. At this time agriculture was being handled by the Department of Education, Health and Lands. The Department of Agriculture as a separate department excluding the subjects of education and health was constituted at the Centre in 1945.

62.5.2 The growth of the State Agriculture Departments took place under Central initiative and with Central assistance and in several fields a new organisational unit was first set up at the Central level before the counter-part organisations at the State and the local level were created. To some extent, this was an unavoidable pattern of development in a historical situation in which decentralisation of authority to the States came as a result of federal dispensation and Centre had to assume a pioneering role in accelerating the pace of agricultural development especially in those areas wherein the State level organisations were not strong and not evenly developed. During the last two decades of planned agricultural development, unprecedented expansion has taken place in the agricultural activities at the Central as well as the State level. In the Fourth Plan and the draft Fifth Plan, about 44 per cent of the total outlay on agriculture and allied programmes is provided in the Central or Centrally sponsored sector. Correspondingly, there has been a rapid expansion in the administrative set-up for agricultural development at the Central level.

62.5.3 On September 1, 1952, in the Ministry of Food and Agriculture (Agriculture Wing) there were 42 officers belonging to the generalist cadres while the total number of technical advisers was 22. On April 1, 1960, there were 84 non-technical gazetted officers and 44 technical gazetted officers and on March 1, 1963, the numbers were 84 and 53 respectively. The number of technical officers increased rapidly after the reorganisation of the Department of Agriculture in 1966. In 1974, the number of technical officers was 210 and of non-technical 115, in the Department of Agriculture proper. This expansion was necessitated by the increased demands on the Centre following the new strategy of scientific agricultural development in agriculture, animal husbandry, forestry, fisheries etc. and the increase in outlays on the Central and Centrally sponsored schemes.

62.5.4 On the other hand, the Study Team on Agricultural Administration of the Administrative Reforms Commission (1967) took an extreme stand on the role of Central organisations in agricultural development, and recommended the abolition of many important Central agencies. The Commission did not give any Report on Agricultural Administration; but in its Report on the Machinery of the Government of India and its Procedures of Work, it did not agree with some of these recommendations such as a drastic reduction in the present position and size of the Central Department of Food and abolition of the erstwhile Departments of Community Development and Cooperation (it favoured a combined Department of Community Development and Cooperation).¹ It may be mentioned that the Report of the Parliamentary Seminar on Agricultural Administration 1968 did not also agree with the approach of the Study Team towards these issues.² In Chapter 8 on Centre-State Relations in Agricultural Development, Centre's role in development of modern agriculture has been dealt with. We are not, therefore, dilating on the question as to why there should be an effective Central organisation for development. The real issues to be considered are, what should be the overall and internal structure of this organisation and how it can be made effective in relation to the State agricultural organisations. The administrative agencies whether at the Centre or in the State should be treated as a part of an integrated system whose main aim should be to promote State and local initiative and participation within a national frame. Accordingly, the decisions regarding the setting up of new organisations or continuance of the existing ones in enlarged or reduced or the same form at the Centre have to be based upon some objective criteria. These are functional necessity, technical efficiency, economy and administrative feasibility and viable relationship with the State level organisation.

Overall Organisational Set-up

62.5.5 Between 1947 and 1974, the Ministry of Agriculture was reorganised several times and the scope and subjects handled and the names of the Departments and the Ministry changed from time to time. The Central Ministry of Agriculture and Irrigation as reconstituted in 1974 consists of the Departments of Agriculture, Agricultural Research and Education, Rural Development, Food and Irrigation. The Department of Agricultural Research and Education was

¹1968. Report on the Machinery of the Government of India and its Procedures of Work, ARC : 91—93, New Delhi, Government of India.

²1968. Report of the Parliamentary Seminar on Agricultural Administration, ARC : 62 & 92—94, New Delhi, Government of India.

created in 1973. The Department of Rural Development came into existence as a result of reorganisation in 1974, replacing the Departments of Community Development and Cooperation. The functions of the erstwhile Department of Cooperation were bifurcated between the Department of Rural Development under the Ministry of Agriculture and Irrigation and the new Department of Civil Supplies and Cooperation under the Ministry of Industry and Civil Supplies. Co-operative agricultural credit went to the former while other functions including consumers' cooperatives, cooperative policy, training and law and the National Cooperative Development Corporation (NCDC) were transferred to the Department of Civil Supplies and Cooperation. Similarly the Ministry of Irrigation and Power was split up and the Irrigation portion was combined with the Ministry of Agriculture to form a separate Department of Irrigation of the Ministry of Agriculture and Irrigation.

62.5.6 From the point of view overall coordination, the relationship between the Departments of Agriculture and Rural Development is of particular significance. Apart from the functions of community development and panchayati raj, the Department of Rural Development has been entrusted with important developmental functions including Drought Prone Areas Development Programme (DPAP), Hill and Tribal Area Development Programme, Pilot Intensive Rural Employment Project (PIREP), Whole Village Development Programme, cooperation in agricultural sector and agricultural credit and indebtedness, agricultural marketing and the Directorate of Marketing and Inspection and crop and cattle insurance. Refrigeration and cold storage facilities for fish, potatoes, fruit and other similar commodities are also with the Department of Rural Development. Along with the reorganisation of the two Departments of Agriculture and Rural Development, certain decisions towards functional integration between these two Departments were also taken. It was decided that divisions relating to "budget, accounts and finance including internal finance", planning and evaluation (including Directorate of Economics and Statistics), foreign-aid and establishment should be common for both the Departments. These divisions were, however, to work under the Department of Agriculture, under the overall supervision of Secretary, Agriculture. It was also decided that a representative of the Land and Water Division of the Department of Agriculture will be included on the monitoring body in the Planning and Evaluation Organisation of the Department of Irrigation which will continue to function separately. A common establishment service for the Department of Irrigation was also envisaged under the Department of Agriculture after some time.

62.5.7 However, even now the responsibilities for credit and marketing are divided at the national level between the Departments of Rural Development and Civil Supplies and Cooperation, NCDC, the Department of Banking, the Agricultural Refinance and Development Corporation and the Reserve Bank of India other apex financial institutions. Departments of Food, Agriculture and Rural Development and the NCDC are concerned with warehousing and storage in one or the other aspect. The Central Warehousing Corporation is under the Department of Food; NCDC is concerned with creation of additional storage in the cooperative sector and the Directorate of Marketing and Inspection is responsible for the administration of the Cold Storage Order, 1964. Departments of Agriculture and Rural Development are concerned with extension. Special programmes for agricultural development and rural employment and the area development programmes are divided between the two departments. The Department of Agriculture for instance is concerned with Command Area Development. We are of the view that separation of cooperative agricultural marketing or the NCDC from the Ministry of Agriculture and Irrigation is not in keeping with the objective of functional integration. A service division like credit and marketing should, from this point of view, be better placed under the Department of Agriculture.

62.5.8 To cite some other instances, the Irrigation Commission held the view that the exploration and exploitation of ground water through heavy duty tubewells should be undertaken by the Ministry which deals with surface water and, therefore, the Central Ground Water Board (CGWB) should be transferred from the Department of Agriculture to the Ministry of Irrigation and Power.¹ Now that irrigation is part of the Ministry of Agriculture and Irrigation, there is a stronger case for the transfer of CGWB to the Department of Irrigation. Minor Irrigation which is at present under the Department of Agriculture should be transferred to the Department of Irrigation in the interest of integrated development of surface and groundwater irrigation sources. Even with regard to fisheries, the Ministry of Agriculture and Irrigation does not deal with all aspects of their development. The Marine Products Exports Development Authority deals with some aspects of development of marine resources. In some cases, parallel schemes sponsored by the Authority and by the Department of Agriculture are taken up with possibilities of duplication. All developmental activities in the field of fisheries should be handled

¹ 1972. Report of the Irrigation Commission Vol. I p. 287, New Delhi, Ministry of Irrigation and Power, Govt. of India.

by the Department of Agriculture. Then the statutory commodity boards dealing with important agricultural commodities like tea, coffee, rubber and cardamom are under the control of the Ministry of Commerce with separate research and extension organisation. We recommend that the research activities handled at present by these Boards should be transferred to the Indian Council of Agricultural Research (ICAR).

Functions of the Central Agricultural Organisation

62.5.9 The need for proper coordination between the various departments and agencies for agricultural development requires no emphasis. Since the Centre will be concerned more with overall plans and policies and the schemes of national importance, there is greater need for an integrated approach at the national level. The Central set-up can be looked at from three angles; the overall structure consisting of the various departments and autonomous bodies and the inter-relationships between them, the internal organisation and management of the departments and finally the functioning of the executive or field level organisations under the Central set-up. These aspects are not exclusive of each other. The growth of the Central agricultural set-up in all these aspects has taken place without any pre-determined or total design for development. For balanced growth of the agricultural set-up, it is necessary that an advance assessment is made of the additional organisational and administrative requirements so that expansion in the production programmes is supported timely by steps to strengthen the administrative machinery. The different functions to be performed by the Central agricultural organisation can be classified as follows:—

- (i) Planning, policy-formulation, general direction and coordination and functioning as a clearing house of information and experience. Cognate functions like organisation of economic, statistical or evaluation units could also be mentioned here.
- (ii) Administrative and institution arrangements at the national level for facilitating various supplies and services *i.e.* inputs, credit, grading, marketing, quality control and storage, agricultural information and farm advice etc.
- (iii) Financial assistance for the State plan schemes for agricultural programmes.
- (iv) Overall supervision and coordination of the Centrally sponsored and Central schemes/programmes implement-

ed through the administrative and extension agencies under the State Governments.

- (v) Functions involving direct administration of programmes by the Centre: (a) research and education including training institutions at the national level and (b) pilot, innovative or exploratory projects in different lines of production *e.g.* ground-water exploration etc.
- (vi) Foreign Aid and Collaboration.
- (vii) Fixation of prices of specified agricultural commodities.
- (viii) Coordination of foreign exchange for agriculture.

Reorganisation of the Department of Agriculture

62.5.10 There is no uniform pattern for the organisation of the various technical services under the Central Ministry of Agriculture and Irrigation. These services are being managed by (a) a unit or division in a department of the Ministry and/or (b) a subordinate or an attached office under the department or (c) a separate autonomous agency. Choice of one or the other form of organisation has been made at different times on varying considerations. Reorganisation of the Department of Agriculture initiated in 1965-66 was attempted on functional lines. The main objectives of the reorganisation were:

- (i) assignment to technical officers, the responsibilities for planning, implementation and supervision of programmes, in addition to their advisory functions;
- (ii) redistribution of subjects and responsibilities so as to make the assignment of every officer and unit compact and specific as far as possible;
- (iii) introduction of an officer-oriented system for the disposal of technical matters, whereby such cases will be handled by the officers themselves with minimum assistance from subordinate staff; and
- (iv) introduction of a procedure and machinery for closer and continuous contact between the Centre and the States in the implementation of agricultural plan schemes.

62.5.11 The main subjects which are being handled at present in the different Departments of the Ministry of Agriculture and Irrigation are as under:

- 1. Department of Agriculture
 - (i) crops
 - (ii) animal husbandry
 - (iii) forestry

- (iv) fisheries
 - (v) inputs including seeds, fertilisers and plant protection chemicals
 - (vi) agricultural machinery
 - (vii) minor irrigation including CGWB
 - (viii) command area development
 - (ix) land development and reclamation including soil conservation
 - (x) land reforms
 - (xi) agricultural extension
 - (xii) agricultural administration
 - (xiii) manpower planning
 - (xiv) economics and statistics including price policy
 - (xv) planning, coordination and evaluation
 - (xvi) budget and finance
 - (xvii) international cooperation
 - (xviii) establishment of personnel administration and parliamentary work in the department
 - (xix) financial assistance to States
 - (xx) foreign exchange coordination
 - (xxi) export promotion.
2. Department of Rural Development
 - (i) area development programmes
 - (ii) agricultural cooperation
 - (iii) community development and panchayati raj
 - (iv) rural employment and rural institutions
 - (v) agricultural credit, storage, marketing and processing.
 3. Department of Agricultural Research and Education
 - (i) agricultural research
 - (ii) agricultural education.
 4. Department of Irrigation
 - (i) major and medium irrigation.
 5. Department of Food
 - (i) food distribution
 - (ii) nutrition
 - (iii) sugar
 - (iv) vanaspati
 - (v) warehousing.

62.5.12 In the various chapters of our Report, we have made comprehensive recommendations of far-reaching importance regarding the manner in which the agricultural programmes should be re-oriented and expanded for achieving rapid and stable growth in the coming years. The detailed formulation of policy, planning and

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execution of these recommendations would entail an enormous increase in the work-load of the Central Ministry of Agriculture and Irrigation. The nature and magnitude of the problem to be handled would warrant the creation of some new departments to facilitate smooth working. Thus we feel that it would be necessary to create new departments to be in charge of crop production, animal husbandry, fisheries and forestry within the overall Ministry of Agriculture and Irrigation. With the creation of these new departments and a rational re-distribution of the subjects among the different departments, some changes will have to be made in the present arrangements. In our view the Department of Rural Development in future should deal with community development, panchayati raj, rural employment, rural institutions and agricultural cooperation. The Department of Crop Production would also deal with the inputs, land development and soil conservation. Minor Irrigation including CGWB should appropriately be transferred to the Department of Irrigation. Also land development in the command areas should be with the Department of Irrigation and the remaining items of command area development can be looked after by the Department of Agriculture. All the remaining subjects can continue to be handled in the Department of Agriculture. Agricultural credit, marketing and export promotion will be common to different departments and hence should also be handled by the Department of Agriculture. Subjects like processing could be handled by the respective departments as in the case of processing of milk by the Department of Animal Husbandry and processing of fish by the Department of Fisheries. The different departments envisaged by us and the subjects to be allotted to each are given below:

1. Department of Agriculture

- (i) Planning, coordination and evaluation
- (ii) area development programmes
- (iii) agricultural extension
- (iv) agricultural administration
- (v) manpower planning
- (vi) economics and statistics including price policy
- (vii) export promotion
- (viii) agricultural credit, storage and marketing
- (ix) land reforms
- (x) budget and finance
- (xi) financial assistance to States
- (xii) international cooperation
- (xiii) foreign exchange coordination

- (xiv) Command area development except work relating to land preparation and development
- (xv) establishment and personnel administration and parliamentary work in the department.
- 2. Department of Crop Production.
 - (i) crop production
 - (ii) inputs including seeds, fertilizers and plant protection chemicals
 - (iii) land development and soil conservation
 - (iv) agricultural machinery.
- 3. Department of Animal Husbandry
 - (i) livestock production
 - (ii) dairying
 - (iii) animal health.
- 4. Department of Fisheries
 - (i) marine fisheries
 - (ii) inland fisheries.
- 5. Department of Forestry
 - (i) production forestry
 - (ii) social forestry
 - (iii) wildlife
 - (iv) forest research and education.
- 6. Department of Irrigation
 - (i) minor irrigation including CGWB
 - (ii) major and medium irrigation
 - (iii) land development and command area development.
- 7. Department of Rural Development
 - (i) community development
 - (ii) panchayati raj
 - (iii) agricultural cooperation
 - (iv) rural employment and institutions.
- 8. Department of Research and Education
 - (i) agricultural research
 - (ii) agricultural education.
- 9. Department of Food
 - (i) food distribution
 - (ii) nutrition
 - (iii) sugar
 - (iv) vanaspati.

While the service and related matters in regard to administration of the headquarters personnel will be handled in the Department of Agriculture, corresponding matters of attached and subordinate offices should be dealt with by the respective departments.

62.5.13 In the integrated set-up for the Ministry of Agriculture and Irrigation proposed by us, coordination of the different activities of the various departments assumes great significance and it would be necessary for some functionary to provide the leadership and take up the role of a coordinator so that the Secretaries of the various departments can look up to the coordinator for guidance and advice. For this purpose, it would be essential that there should be a Principal Secretary in the Ministry of Agriculture and Irrigation who besides playing the role of a coordinator could also be in charge of the Department of Agriculture which deals with the most important functions of planning budget and finance, area development programmes, agricultural credit, economics and statistics, foreign aid, etc. We feel that the post of Principal Secretary being of key position, the person will have to be selected with great care. He should be known for his qualities of drive, energy, leadership, etc. and experience of agricultural development administration. This post need not be the exclusive preserve of either the generalist-administrator or technical persons. The best man available for the job should be selected for the post of Principal Secretary in the Ministry of Agriculture and Irrigation.

62.5.14 The Secretaries of the Department of Crop Production, Animal Husbandry, Fisheries, Forestry, Research and Education and Irrigation should be scientists specialised in their respective fields. The future course of agricultural development is largely based on the application of science and technology to agriculture. The administrative and policy decisions will have to be taken on careful consideration of the scientific and technical implications of the various issues and, therefore, technical experts would be more suitable to undertake this role and function as Secretaries to these departments. This will also be in keeping with the changes which have been made by the Government in the different technical departments and Ministries of the Government of India where scientists and technocrats have been placed as Secretaries of the respective departments.

Coordination between Research and Development

62.5.15 In the Interim Report on some Aspects of Agricultural Research, Extension and Training we have drawn attention to the need for close coordination between agricultural research and development in the States. This is all the more necessary at the Centre where the ICAR has been given the overall responsibility of developing agricultural research in the country and of funding it also. A Research and Coordination Committee was set up in the Central

Department of Agriculture in 1969. The Committee was presided over by the Director General of ICAR. This Committee, unfortunately, has not been able to fulfil the role of an active coordinator. It is obvious that there is need for an effective coordinating body. We, therefore, recommend that for this purpose a Joint Council may be set up comprising the Principal Secretary, Secretaries of Departments of Crop Production, Animal Husbandry, Fisheries and Forestry, the Secretary, Department of Agricultural Research and Education (DG, ICAR), and the Extension Commissioner who will be the convenor of the Council. This group will be presided over by the Principal Secretary of Agriculture. This Council should meet at least four times a year and make an appraisal of the overall research situation in the country and how new findings in research can help the immediate production programmes. Programmes at a national level requiring urgent research support should be identified and referred to the ICAR for immediate support. Points for extension should be identified and should be handled promptly by the heads of the technical departments and the Extension Commissioner.

Planning Division

62.5.16 There has to be an integrated plan for development of agriculture for the optimum utilisation of the agricultural potential of the country. The plan has to be formulated by the Centre in cooperation with the States on the basis of information flowing from the field level. In the sections on field level organisations and State-level organisation, the formation of planning units at both these levels has been recommended. The chain should be completed by having a well organised planning division in the Ministry of Agriculture and Irrigation dealing with formulation, coordination and evaluation of the plans. The issues relating to overall agricultural policy will also be dealt with in this division. At present, the Directorate of Economics and Statistics in the Ministry is looking after the planning work, but does not undertake planning exercises on its own and functions more as a liaison unit between the subject matter divisions within the Central Department of Agriculture, the States and the Planning Commission.

62.5.17 The Planning Division should have the type of expertise necessary to take a national view of agricultural development and suggest the directions of development. This work is a two-way process of getting suggestions from the field level, analysing them, throwing back suggestions for consideration and finalising the plans after mutual consultation. Coordination between the departments

within the Ministry at the Centre and between the Centre and the States is a basic condition of effective implementation of the national development plan. For the purpose of coordination, the Division has to maintain continuous liaison with the States. However, in carrying out its coordination functions, the Planning Division should not become an operational division and try to direct sectoral programmes on its own. It should rather function as a unifying link than a super-division and should not cut across the correspondence by the individual subject-matter and other divisions with the States and other agencies. The Division should be officer-oriented.

62.5.18 For the purpose of concurrent evaluation and assessment of progress, data will have to be brought up from the field level the evaluation process should consider aspects having all-India State, district and the block levels should also be responsible for concurrent evaluation/progress analysis. The type of evaluation at different levels will have to be as follows. The field level should go into the details of the programme. A broad view of the progress of schemes should be taken at the State level and at the national level the evaluation process should consider aspects having all-India implications. The process of concurrent evaluation and progress—analysis can function on a clear demarcation of responsibilities at the various levels.

62.5.19 The Planning Division in the Department of Agriculture will be in a position to furnish the Planning Commission a realistic and up-to-date assessment of the progress of development scheme/projects/programmes and policies. However, the evaluation functions to be performed by the Planning Division will be concurrent evaluation and will be distinct from the evaluation function of the Planning Commission which is essentially in depth and of a long-term nature.

62.5.20 The Directorate of Economics and Statistics will feed the Planning Division and the latter will not have a statistical cell of its own. In order to have proper liaison between the two organisations, the Economic and Statistical Adviser may be given a suitable place in the Planning Division. The existing planning unit in the Directorate of Economics and Statistics should be transferred to the Planning Division.

62.5.21 The Planning Division, as also the budget and finance division, which will work in close harmony, should be placed under the Principal Secretary, Agriculture, in the Department of Agriculture to enable him to act as an effective leader of the team. The Division may be headed by a senior officer of the rank of Additional Secretary having the required qualifications and background for dealing with planning, administrative coordination and evaluation work.

It might be added that the Administrative Reforms Commission in its Report on Planning Machinery had also recommended that each department should have a planning unit.

62.5.22 In the distribution of items of work in the Central administration, the functions which are important for agricultural development are located amongst several ministries and several departments. Unless coordinated policy acceptable to all the ministries and departments concerned can be laid down and a coordinated action programme is accepted by all the implementing agencies, the Central Ministry of Agriculture and Irrigation cannot perform the role of the planner and coordinator of the agricultural development programme of the country. A machinery has to be developed to ensure this quick response in policy and in performance. At present, at the secretariat level, coordination is achieved through high-powered inter-departmental committees. The following Committees are helping in the development and support of export-oriented agricultural commodities:

- (i) High-powered Committee on main export oriented agricultural commodities,
- (ii) High-powered Committee on processed agricultural and food products, and
- (iii) High-powered Committee on vegetable oilseeds, oils and oilcakes.

Similarly, there is an urgent need for setting up such a Committee in the matter of credit where the Departments of Civil Supplies and Cooperation and Banking are concerned along with the Reserve Bank of India and the key credit institutions like the Agricultural Refinance and Development Corporation and the Union of Land Development Banks. Transport, storage and fertilisers and chemicals similarly require coordination between different departments and ministries. The Committee set up with an active secretariat in the Department of Agriculture can fill this need for coordination amongst the departments and ministries. We recommend that wherever a need arises for policy coordination amongst ministries and departments, such high-level committees should be formed.

62.5.23 Each of the ministries at the Centre dealing with production, distribution and control have subordinate offices and directorates to carry out the executive functions required. Many problems which are purely of an executive nature can be disposed of at the executive level without having to bring them up to the policy level. Therefore, for every such item of execution in the agricultural programme which requires the cooperation of the executive of

other departments, it is necessary to form similar *ad hoc* groups of implementation under the different departments of the Ministry of Agriculture and Irrigation to process these cases.

62.5.24 The Planning Division should be the secretariat for dealing with the policy level committees. The executive level committees can be handled by the relevant departments but in the matters which may affect policy planning, the Planning Division should be kept continuously informed.

62.5.25 As brought out in the Chapter 8 on Centre-State Relations in Agricultural Development, there is need for making a continuous study of agrarian legislation, regulatory acts, etc. in the country. An attempt should be made to unify action in these matters as far as possible, keeping in view that agriculture is extremely regional in character and an all-India frame in details may not work. The Ministry of Agriculture and Irrigation should involve itself in a study of agrarian legislations and regulatory acts and create a consensus for model legislation and also bring to the notice of the States loopholes in legislation which may need coverage in the national interest. This work should be placed under the division for land reforms and land management legislation because land reforms and land management laws form an important part of the overall legislation.

Extension Set-up

62.5.26 There is a Directorate of Extension at present under the Department of Agriculture which acts in isolation. This unit was formed for giving leadership in extension organisation in the country. It has given good leadership in training but in extension, in the field of propagating field programmes, there is a substantial gap between needs and effort. At present, the bulk of the extension work is in crop production. The need for extension work in animal husbandry has become important along with the introduction of various programmes of animal husbandry development. Fisheries development also now requires extension support for the inland fisheries programme in fresh water and brackish water fish rearing. To discharge these functions effectively, the extension set up will have to be suitably organised and equipped. The extension organisation has to put across the ideas which are propagated by the production divisions concerned. What should be put across has to be decided by the respective departments. How it has to be put across is the concern of the extension machinery. Without a link up of the two for an effective programme, the extension work will continue to be

indifferent. One view is that since crop production is at present occupying most of the time of the extension wing, it is desirable to put this unit under the control of the Department of Crop Production.

62.5.27 Extension of knowledge to a large mass has to be done by an organisation expert in mass communications which understands the tools available for the purpose and the scope and the limitations of each of these tools. In agricultural extension, the tools available today are man to man audio-visual transfer through talks and discussions by the extension organisation and demonstrations. This is a field in which the extension organisation at present concentrates and has built up some expertise. Another tool of mass communication is the radio broadcasting system of the country. As we have explained in the Chapter 54 on Extension this is a very powerful medium. The extension organisation has not yet built up the expertise to utilise this medium. A new mass communication medium is now developing in television. This medium has yet to gain currency in operation. The services of the Press particularly the language papers have also to be enlisted.

62.5.28 An expert organisation under competent technical leadership has to be built up for appropriate use of these media. Since this organisation has to be effective in dealing with all aspects of agricultural development including animal husbandry, fishery, farm forestry etc., it will not be desirable to place the Directorate of Extension under any one single technical department of the Ministry. We recommend that the Extension Directorate should be in the Department of Agriculture under the Principal Secretary. In view of the complex nature of the problems to be handled by the extension organisation, immediate steps should be taken to develop a highly competent organisation under an Extension Commissioner who should be a technical officer of the rank of an Additional Secretary.

62.5.29 The organisational guidance and direction in extension at the block level are provided by the Department of Rural Development. This organisation is also handling various training programmes of extension functionaries from State to the block level. On an analysis, it will be seen that these training programmes have the same objectives and contents as the training programmes conducted by the Directorate of Extension. The National Institute of Community Development, at Hyderabad, an institute of Rural Development Department, has been running training courses for Extension Officers and the trainers of the trainees in extension communication methods, etc. Similar training programmes are being run by the Extension Directorate and Orientation and Study Centres for training of BDOs and EOs in the States which operate under technical control of the

Rural Development Department. It is, therefore, suggested that the technical guidance and advice regarding extension organisation, training and communication should emanate from one central extension organisation which should be adequately strengthened for that purpose.

62.5.30 Extension organisation has established its leadership in training. But its role as a leader in production programme has yet to be fully understood and developed. The detailed extension work is the responsibility of the State Governments. There should be no attempt by the Central organisation to interfere in the working of the State extension organisations. On the other hand, having developed a competence in utilising the powerful tools of extension, the Central organisation can be the pace setter and the guide to the State extension organisations in utilisation of these tools. The Central extension organisation should be responsible for the development of a national approach regarding the best method of utilisation. This method should be evolved after consultations with State Governments and others concerned. Education in the utilisation of the tools of extension should also be the Central responsibility.

62.5.31 The development departments are the clients of the extension organisation. There has to be a machinery for mutual consultation, evaluation and coordination between the production divisions and the extension organisations. The Joint Council under the Chairmanship of the Principal Secretary which we recommended in paragraph 62.5.15 should deal with problems of coordination and progress of extension work needed in the different fields. This Committee should meet at least once a quarter to lay down the programmes of action for all concerned and also periodically check performance.

62.5.32 The bulk of the administrative organisation in the field and the structure for the two-way dialogue between the Centre and the field deal mainly with the problem of extension of scientific agriculture to the farmers. We have in this chapter given some broad directions in which improvements can be carried out in the administrative and organisational structure for more effective performance. Whereas the broad structure that has been postulated may stand the test of time, the details within the structure may have to be adjusted continuously to meet the needs. New problems of production will be thrown up in various sectors. All this requires a continuous appraisal of the administrative structure and its orientation to the emerging situation. The study of this administrative organisation and its modifications can be usefully done in the extension organisation in consultation with the concerned departments.

Programme for Women

62.5.33 There is another programme which in our opinion the Directorate of Extension should handle. This is the Women's Programme. In the rural life of India in general and farm life in particular the existing and potential roles of women have not been correctly assessed and appreciated. There is, in fact, a tacit silence about the importance of women in the variety of activities they are engaged in. Their presence is simply taken for granted. Constituting half the farming population, they perform a greater number of chores than their male counterparts. They have to take care of the stores, the kitchen, the children, the cattle, poultry and other animals, kitchen gardening and so on. In the performing of these manifold tasks they are greatly handicapped because of illiteracy, which is so widespread amongst the women of rural India. They are also denied the training facilities which are usually obtainable in rural areas. The disability of women is all the more acutely felt in the context of greater and greater dependence on science and technology in all activities including farming. If they are properly trained and geared to the technological advances being made in the agricultural field, the gain is going to be immense and a continuing one. They will be transformed from their existing passive role to an active one, in which they would be able to take part not only in farming proper but also as makers of the home. Because of their experiences in home-making and what constitutes health and nutrition of the family, their opinions in regard to agricultural planning and production would be of value. The nation has, however, so far failed to utilise properly the vast untapped source of power available in women in the rural sector.

62.5.34 It is not true that the issues relating to rural women have been totally ignored. But a sense of half-heartedness and lack of interest are noticeable in the execution of most of the programmes meant for them. Moreover, these programmes are being dealt with by several departments, and coordination amongst them is lacking. In addition funds are limited, so also are adequate number of trained personnel to implement the programmes. In the face of a situation like this, these programmes should be specifically planned and executed under a single authority.

62.5.35 The Departments of Rural Development, Social Welfare and Health, Directorate of Extension and Central Social Welfare Board are at present dealing with several developmental programmes concerning women and children. But they do not seem to have made the impact expected of them owing to lack of technically qualified staff in adequate number and of involvement of women in the proper sense of the term.

62.5.36 All such programmes as are being handled by other departments and ministries would be better coordinated by the home science and nutrition, education section of the Extension Directorate and these should be brought under its fold and the section should be strengthened with adequate number of qualified persons. We, however, envisage a greater involvement of women in the broad canvas of rural India not only as primary producers of food but also as conscious participants in various farm activities and as effective homemakers. In that context and in order to carry out the above ideas in practice, scattered organisations weakened by lack of funds and adequate staff will not do. Only a strong and unified organisation staffed with technically qualified persons in adequate number and backed by the necessary financial resources can deliver the goods. We are of the view that there should be ultimately a full-fledged division in the Ministry of Agriculture and Irrigation to take charge of women's programmes. In order to make a beginning in this direction, we suggest that the existing Home Science and Nutrition Education Science unit in the Extension Directorate be converted into a full-fledged directorate, which may be designated as Directorate of Women's Programme and placed under the administrative control of the Extension Commissioner. This directorate would be responsible for the formulation and execution of a comprehensive programme exclusively for rural women and children. The details of this programme should reflect women's socio-economic status in relation to agricultural production, nutrition, population, education and overall resource management. Apart from providing technical and administrative guidance the Directorate should maintain direct liaison with State Governments in matters concerning training of personnel and programme guidance. It should also act as a consulting body to other departments and ministries, and home science colleges of agricultural universities in connection with the development of curricula, personnel training, etc. For this purpose, the directorate should be adequately equipped with subject matter and extension specialists and other personnel. These measures would provide the needed technical supervision from one source.

Guidance to States

62.5.37 In order that Centre is able to provide effective guidance to States in various matters affecting the agricultural sector as a whole, the technical divisions in the Ministry of Agriculture and Irrigation should possess the right kind of expertise. There are a large number of directorates and organisations under the Ministry of

Agriculture and Irrigation. These directorates and organisations have to execute the Central schemes and monitor the Centrally-sponsored schemes and, at the same time, give technical advice to the States where required. It is noticed that for lack of sufficient decentralisation of financial and administrative powers, bulk of the detailed work which has to be done in the directorates and organisations is at present handled in the Central production divisions. As a result, the production divisions are not in a position to give overall technical guidance to the State organisations. Decentralisation of powers should be carried out quickly so that the experts of a high level in the Central departments are in a position to devote their entire time to professional guidance and overall direction to the national programmes in the States and at the Centre.

62.5.38 The aforesaid organisational steps will have to be supplemented by constitution of a Consultative Council at the Central level. Decisions on key issues having overall importance should flow from a well-knit expert and unified body at the national level. Decisions on such issues that have to be taken in the light of developments in the different inter-connected fields cannot be taken in segments. Coordination between research and development at the national level is of particular importance. The problem can be dealt with by setting up a standing Consultative Council which should meet frequently for taking coordinated decisions. The heads of departments or divisions or the Secretaries-in-charge of agricultural departments and the representatives of the State Governments could be associated with this Council. The Council may be presided over by Minister for Agriculture and Irrigation. The Consultative Council at the Central level will be concerned primarily with the basic policy issues and approaches and will be supported in actual operation by the Planning Division at the Central level. The size of the Consultative Council, however should not be unwieldy. It is also necessary that experts in a particular line are associated with the Council, when subjects pertaining to their fields are discussed. Before the matter is placed before the Consultative Council, there should be prior consultation between the concerned divisions in the Central departments and the States. The issues crystallising after this examination may be brought before the Consultative Council. There may be separate consultative groups, say, for agriculture, animal husbandry, fishery, forestry, etc. for mutual consultations. These Groups can be formed at Secretary's level and may include the heads of divisions, the heads of the department at the State level and other experts. The Consultative Council will not be concerned with the details of implementation. Important policy issues which cannot be resolved at Secre-

taries' level may be placed before the conference of State Agriculture Ministers. In this way, a link could be established between the Consultative Council and the conference of State Agriculture Ministers.

Coordination in respect of Export-oriented Commodities

62.5.39 The Parliamentary Seminar on Agricultural Administration (1968) held the view that research carried on by Boards for commodities such as coffee, tea, rubber etc. should be taken over by the ICAR. This was also recommended by a number of other expert bodies and needs to be implemented early. Even on development side, there has to be close coordination in relation to export-oriented agricultural commodities between the Ministries of Agriculture, Commerce and Industrial Development concerned with production, export and import and processing respectively. At present, coordination is secured through inter-departmental High Powered Committees to which a reference has already been made in paragraph 62.5.22. In this connection, it may be added that there has been frequent demands for having a Board type of structure under the Ministry of Commerce for other agricultural commodities like cashew, spices etc. Such an organisation works in isolation from the State development and extension agencies and is not suitable for crops cultivated by a very large number of farmers in small units of management. In fact, even in the case of plantations like tea, coffee etc. the number of small farmers is gradually increasing. Consequently the problems of organising extension, credit and supplies and related services for the small farmers have assumed much greater importance now. It is necessary, therefore, that there should be a strong organisation for extension and rural development. Research and extension in respect of crops covered by the commodity boards will have to be brought under the agricultural set-up. The Ministry of Commerce will continue to handle the marketing aspects including exports.

Internal Organisation and Management

62.5.40 Internal organisation and management of the Department of Agriculture and the working of its field level organisations are as important as the overall structure. The main functional divisions and departments of an integrated developmental set-up have already been indicated. It is not necessary to go into the details of

the organisation and functions of each of these divisions. Certain common and key problems only need to be highlighted.

62.5.41 In the existing set-up, the technical officers are dealing with secretariat matters and are also supposed to take final decisions on all technical matters. However, in most of the technical divisions there is a technical hierarchy along with an administrative hierarchy. Since the purely establishment and personnel matters have been separated and are dealt with in a centralised manner by the establishment and personnel administration division there is hardly any need for two separate hierarchies for dealing with technical and administrative functions. The administrative functions in a technical division relate *inter alia* to preparation of the budget for the schemes and offices under a particular department, review of progress of expenditure, administrative and financial scrutiny and sanctions, other financial matters relating to development programmes including settlement of accounts and organisational issues arising in the course of implementation. Further in this set-up proposals have to be routed through four to five levels before a final decision is taken. This is against the basic objective of the reorganisation scheme which envisaged an officer-oriented system. Its object is, to bring expertise and experience of the technical officers to bear upon initial examination and thinking on questions referred to them.

62.5.42 Besides, there being a lot of common ground between technical and administrative functions in the technical divisions, there is a strong case for the technical officers being also assigned administrative functions such as preparation of developmental budget, issue of sanction to schemes, control of expenditure etc. For this purpose, the technical officers should hold secretariat posts in the respective departments so that they are able to take final decision on all technical matters.

62.5.43 The quality between a technical head such as Agricultural Commissioner or the Animal Husbandry Commissioner and an administrative head who is in overall charge of the division such as an Additional Secretary (or Joint Secretary in the case of smaller Divisions) should also be removed. The Agricultural Commissioner or the Animal Husbandry Commissioner, the Fisheries Commissioner or the Inspector General of Forests should be Secretaries of the departments concerned. The heads of inputs divisions should also be technical officers who should be given appropriate ex-officio status. Thus the entire Ministry of Agriculture and Irrigation should mostly consist of technocrats with necessary administrative and management training. A non-technical secretariat officer will be required only in house-keeping divisions dealing with budget and administrative and

personnel management. The Agricultural Marketing Adviser and the Plant Protection Adviser should be given ex-officio Joint Secretary status. Keeping in view the nature of duties and responsibilities of the extension Commissioner, he should be given ex-officio status of Additional Secretary to the Government as already recommended. This will quicken the process of decision-making. The post of Economic and Statistical Adviser who is the head of the Directorate of Economics and Statistics, carried with it the ex-officio status of a Deputy Secretary although for the last several years the post was being held by officers of a higher status. Even though the Pay Commission had recommended higher status to the Economic and Statistical Advisers in other Ministries, the post of Economic and Statistical Adviser in the Ministry of Agriculture and Irrigation has not been raised to the status of a Joint Secretary. We recommend that keeping in view the nature and functions of the Economic and Statistical Adviser his status should be raised to that of a Joint Secretary.

62.5.44 The Principal Secretary in the Ministry of Agriculture and Irrigation should be a source of overall guidance and should, therefore, be free to devote himself to key policy questions. The situation in which almost every important decision is to be approved by Secretary must be done away with. In fact, disposal of any case should not, generally, involve more than two levels. Unless responsibilities are fixed at each level and multiplicities of hierarchies removed, the Ministry of Agriculture and Irrigation will not be able to function with the needed speed and urgency.

62.5.45 Technical posts including those at the intermediate levels in the Central Ministry of Agriculture should be tenure posts so that officers working at the district level could also be brought straight to the Central Ministry of Agriculture and Irrigation. The period of tenure should not be too short and may be fixed at five years. However, even the senior most officers including the heads of divisions should go back to the States at the end of the tenure. At present, this kind of inter-change between the Centre and the States is very limited.

62.5.46 The posts of Commissioners of Agriculture, Animal Husbandry and Fisheries and Inspector General of Forests-cum-Secretaries to the respective departments should also be filled on a tenure basis from amongst the competent and senior officers in the States and the Centre. Ultimately when the all India Agricultural Service is formed, senior officers from the service will be eligible for appointment to these posts. Further in the case of the Animal Husbandry Commissioner, the post should not be a close preserve of any one field; the

recruitment should be made from amongst the outstanding scientists in the disciplines of veterinary science, livestock production or dairying.

62.5.47 A brief reference may be made to the working of the advisory bodies. Firstly, there is multiplicity of such bodies most of which have come into existence during the last decade and half. These are, in many cases, inactive and the frequency of the meetings is not laid down on a strict basis. Besides, they are invariably dominated by the official representatives. The follow up action on the recommendations is totally inadequate and there is no arrangement by which the working of these bodies could be coordinated and evaluated periodically. It would be better to have a small number of compact bodies covering homogeneous groups of subjects with a strictly laid down drill of meetings, reviews and follow-up action. With the constitution of the Consultative Council and the Consultative Groups as suggested, it should be possible to do away with a large number of advisory bodies.

62.5.48 A closely related aspect is the place that should be given to the field level units under the Department of Agriculture which have grown rapidly during the Plan-period. These units are located at the regional, State headquarters and sometimes at the district or the local level also. There are a large number of such units under the Directorate of Marketing and Inspection, Directorate of Plant Protection, Quarantine and Storage and the Directorate of Economics and Statistics. Then there are the Directorates of Development under the crops division, regional breeding and forage production units etc. under the animal husbandry division, training and pilot projects under the fisheries division and a few survey, research and training centres under the soil-conservation and agricultural machinery units.

62.5.49 It is necessary that the functioning of these units in relation to the counterpart organisation at the State level should be subjected to periodical review. In a number of cases, Centrally operated units might be justified on account of gaps in the State level organisation at the given stage of development. This may not be the case at a subsequent stage when the State level organisation has come into its own. In other cases, there would appear to be need for closer working relationship between the field units under the Central and State organisations. This is true particularly of a large number of pilot projects, model farms etc. taken up in order to give a push to the related programmes. As a general policy the continuance of such projects should be reviewed from time to time and those which could be transferred to the State sector should be done so immediately. For instance, continuance of 8 Central plant protection stations merely as a supplement.

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mental source of supplies does not seem to be justified especially when the State level machinery is better organised than when these Central units were initially set up. However, where surveillance, monitoring and forecasting for major pests involve many States, the functions should be with the Centre. To take another area, the field staff under the Directorate of Marketing and Inspection or the Directorate of Economics and Statistics can be a source of guidance to the State level staff. Closer rapport between them should be encouraged.

62.5.50 Development corporations have emerged now as the accepted pattern of development in almost every field. In many fields, there are national as well as State level corporations while in some cases there might be State level corporations without national corporation or *vice versa*. Central corporations should be constituted after due consideration. Generally speaking, when certain fields of executive activities have to be taken up by the Centre directly, a directorate is preferred. But when the realm of activities belongs essentially to the State sector and the Centre is to provide only technical guidance, supervision and consultation, the function could be assigned to a division within the administrative department. In the case of commercial/promotional operations a corporation or an autonomous form of management is favoured in order to allow greater operational freedom which is not possible under the system of departmental controls. This is also necessary in order to tap institutional finance. Before a corporation is set up, some basic considerations must be kept in view. An autonomous structure at the national level must be supported by similar arrangements at the State level. With the proliferation of development corporations, there might be lack of coordination between different units resulting in duplication of activities. Therefore, before a new development corporation is set up, its relationship with other organisations in the same or allied sectors will have to be defined. The development corporations should not be isolated from the general development and extension set-up at the State level and the attempt should not be to duplicate the State-staff and organisation. One way to secure coordination among the different corporations is that the Ministry of Agriculture and Irrigation must have a representative on the managing committee of these corporations. However, the Ministry should not be directly involved in any operation of commercial nature. The working of the development corporations in different fields must be reviewed from time to time in an integrated manner to avoid some of these pitfalls, and to assess if the continued existence of such corporations was necessary at the national level or that these could be transferred to the States.

62.5.51 The working of the administrative set-up should be re-

viewed periodically to keep the system under constant watch and make it equal to the new tasks and responsibilities.

6 TRAINING IN AGRICULTURAL ADMINISTRATION AND MANAGEMENT

62.6.1 In the administrative system recommended by us the technical officers have been assigned important responsibilities as administrators of agricultural development programmes at all levels. The existing separation between technical and administrative functionaries is based upon an incorrect premise that the technical officers are not suitable for taking up administrative responsibilities and that when they do so it will be at the cost of their technical specialisation. As brought out in the foregoing paragraphs, the managerial and administrative functions in the field of agricultural development can be performed more efficiently by a technical officer than by a general administrator. The latter is not able to fully comprehend the complexities of the problems of agricultural development in their technical as well as non-technical aspects. However, in order that the technical officers are able to discharge the administrative and managerial responsibilities, they have to be suitably trained in agricultural administration and management. They must develop the required administrative and managerial skills if they are to exercise the administrative and financial powers effectively and shoulder higher responsibilities. At present there are no formal arrangements for training of agricultural personnel.

62.6.2 The subject of training is dealt with the Chapter 53 on Education and Chapter 54 on Extension. However, some of the basic principles of training in agricultural administration and management and recommendations in this regard are dealt with here. Agricultural administration and management involves much more than mere subject-matter competence. In the case of agricultural administration, the emphasis would essentially be upon overall coordination and supervision, decision-making, general and financial administration including formulation of budget, control of expenditure and performance audit and personnel management. Decision-making requires an inter-disciplinary approach in which familiarity with the essential principles of agricultural economics, agricultural science and administration is necessary. Under management training as distinct from agricultural administration stress would be on input and output management and techniques of programme planning and execution. One of the main objectives of training in agricultural administration and management is to inculcate the spirit of coordinated working. An

individual technical officer or a subject-matter specialist must understand the milieu of the total agricultural sector in which he has to work. He should be fully aware of the working of the different agencies and programmes which would have an impact on his own individual field of operation. Due emphasis has to be given in the training programme upon flexibility of approach, greater use of individual discretion and initiative.

Training Programme

62.6.3 Firstly, training should be given at the point of entry into the service both for recruits to the Indian Agricultural Service proposed by us as well as to the other posts in the Central and State agricultural departments. This training should give due emphasis upon management and administrative aspects. Secondly provision should be made for in-service training which should lay emphasis on administration, decision-making and planning and coordination. Apart from inculcating team spirit and introducing inter-disciplinary approach, the training programmes should give due importance to love for rural life and rural atmosphere so that the trainees develop a natural aptitude for agricultural development work. The training at the point of entry should be job-oriented. The in-service training must be provided to all within a certain period of service, say, five to seven years after an officer has joined the service. There should be automatic deputation so that no administrative hurdle prevents an officer from availing of the training opportunities.

62.6.4 The fresh recruits to the All-India Agricultural Service should be given training in the same way as the recruits to the IAS and other all-India services are given in the National Academy of Administration, Mussoorie. The course content and syllabus as well as details of field training to be given to these Indian Agricultural Service officers should be worked out in detail. This training can be given at a Central agricultural administrative college which may be called the All-India Institute of Agricultural Administration and Management. Similarly, new entrants to the State agricultural services both Classes I and II should also be given similar training at staff colleges set up at the State level.

62.6.5 In Sections 3 and 4, we have suggested that technical officers should be given administrative responsibilities and that the Commissioners should be Secretaries of the concerned departments. When the Indian Agricultural Service gets started and as time elapses, sufficient number of technical officers trained in agricultural administration will be available after they pass through the pre-service train-

ing course referred to in the previous paragraph. Till then, the senior officers both at the Centre and in the States should get training in administration and management. Therefore, immediate arrangements should be made for providing in-service training to these people in some of the existing institutions.

62.6.6 The State-level technical officers who need training in administration and management could be divided into 4 categories:

- (i) Agricultural Assistants, Assistant Agricultural Officers, AEOs and corresponding officers in the sphere of animal husbandry and fisheries, etc. where the minimum educational qualification is a degree. These Agricultural Assistants constitute the base level nearest to the field operations;
- (ii) Assistant Directors and similar other posts including all class II and junior class I posts. The posts of District Agriculture Officers in-charge of a sub-division or a taluk will also be covered by this category;
- (iii) Senior class I posts at the district level or above, namely, Deputy Directors etc.; and
- (iv) Joint Directors and equivalent or higher posts in the agricultural departments.

62.6.7 To the first category, namely, Agricultural Assistants, AEOs etc. training should be provided in agricultural management and rudiments of agricultural administration. The content of the training course should include programme planning, administration, maintenance of accounts, preparation of progress reports and other proforma reports. Similar workers in the fields of soil conservation, horticulture, animal husbandry, dairying and fisheries could be given training in separate groups. The responsibility for providing training in management and administration for this level of staff should be with the State Governments. Depending on the number of trainees, accommodation and other facilities available, it might be necessary to train officers at this level in 3 to 4 batches during the year.

62.6.8 As regards the second category for junior Class I and Class II officers, the course may last for 3 months, comprising both training in agricultural management and administration. For this category, there should be greater emphasis upon the administrative and financial aspects. The responsibility for providing training to these officers also should rest with the State Governments.

62.6.9 The third category consisting of Deputy Directors and senior Class I Officers constitutes the source from which officers at higher level in the agricultural hierarchy would be selected. It is, therefore, necessary that in their case the training should be of more

intensive nature and last for a longer period, say 6 to 9 months. The course content should cover both agricultural management and agricultural administration in all its details. Overall coordination and supervision, decision-making, budgetary operations and financial administration would more prominently figure at this level. Facilities for training to this category may also be provided by the State Governments.

62.6.10 The fourth category, namely, Joint Directors and above could be provided training at the All-India Institute of Agricultural Administration and Management with greater emphasis on management for a period of about 3 months. These officers will be concerned mostly with the overall planning at the State level and policy decisions on technical as well as administrative issues. They should also be helped to develop an all-India outlook and perspective both with regard to planning and implementation. The training course should, therefore, include proper orientation in decision-making, financial administration, personnel management and principles of coordination. Knowledge about secretariat organisation and working of inter-departmental relationship would also be necessary.

62.6.11 The officers under the third and fourth categories should also be provided proper training in the techniques of planning and should be familiar with basic principles of agricultural economics.

62.6.12 For purposes of training, the technical officers at the Centre could also be divided into 4 categories, namely, (1) Research Officers, Assistant Directors or equivalent posts; (2) Deputy Directors, Assistant Commissioners, Senior Research Officers or equivalent posts; (3) Joint Directors, Deputy Commissioners or equivalent posts; and (4) top-level officers such as Commissioners, Joint Commissioners, Directors and Heads of Departments in the Ministry. The training needs in administration and management of these four categories, the course content and the period of training would also differ, depending broadly upon the nature of duties they are expected to perform and the responsibilities they are to shoulder in their respective spheres. The senior officers at the Centre should be trained at the All-India Institute of Agricultural Administration and Management whereas the junior officers could be trained at one of the State Institutes so that they get an opportunity of getting into closer contact with the officer-trainees at the State level.

7 SUMMARY OF RECOMMENDATIONS

62.7.1 The main recommendations are as under :

1. The village level workers should continue to be multipurpose workers but they will deal with different disciplines of crop production, animal husbandry, fishery and farm forestry only. Of the 10 VLWs in the block in the general pattern, 8 should be allotted for this work and 2 might look after extension work in spheres other than agriculture.

(Paragraphs 62.3.4 and 62.3.31)

2. Ordinarily there should be a direct hierarchical control from the VLW to the District Officer and to secure cooperation and participation from people in agricultural development programmes the technical organisations should work in close association with the elected representatives. Where the zila parishad is active and effective, the district field organisations may be put under its control but even then, the link-up at the taluk/block and village level technical organisations with the corresponding panchayat samiti organisation and village panchayat, if any, will have to be severed so that there is unified technical and administrative control at the district level.

(Paragraphs 62.3.8 to 62.3.10)

3. Coordination in the agricultural sector should be achieved through a senior technical officer belonging to one of the agricultural disciplines. The District Collector should not have administrative control over the district officers in various subjects in the sphere of agricultural development and should not be concerned with their detailed working. For ensuring coordination at the district level, there should be a Chief Agricultural Development Officer (CADO) in each district. However, all the district level officers under the different departments will continue to function independently as at present under the respective departmental heads at the regional/State headquarters. The CADO should not interfere with the working of the technical officers except what is required for the purpose of planning, coordination and progress evaluation.

(Paragraphs 62.3.16, 62.3.17 and 62.3.22)

4. The team of subject matter specialists at the district level will have to be adequately strengthened to include an agricultural economist and a farm management specialist.

(Paragraph 62.3.18)

5. For facilitating coordination and consultation, all the different branches of the district level organisations may be located in the same building or on the same campus offering full opportunities for mutual discussions and exchange.

(Paragraph 62.3.18)

6. There should be a separate planning and coordination unit for agriculture at the district level which should also deal with progress

and evaluation. The unit should be placed under the CADO.

(Paragraphs 62.3.19 to 62.3.21)

7. Subject to eligibility and competence, officers of the different agricultural departments should be given their due share in the pool of officers from which the selection of the CADO is to be made.

(Paragraph 62.3.21)

8. There should be a District Agricultural Coordination Council on which the various non-official and autonomous bodies operating in the field of agriculture as well as the district level specialists/district officers concerned with various disciplines should be duly represented. The council should be an advisory body under the chairmanship of the CADO. It may be supported by consultative groups for different areas of development under the CADO.

(Paragraph 62.3.24)

9. There should be a Block Agricultural Development Officer (BADO) at the block level who should be directly responsible to the CADO and should have the same role of coordinator as the CADO, at this level. The present BDO should deal only with the development in the non-agricultural sectors.

(Paragraph 62.3.25)

10. At the block level there should be a unit under the BADO to watch the progress of agricultural development programmes.

(Paragraph 62.3.26)

11. On the pattern of the agricultural coordination council at the district level there should be a block agricultural coordination committee.

(Paragraph 62.3.27)

12. The norms regarding staffing pattern and the strength of extension workers would differ from area to area and should be worked out separately for different areas.

(Paragraph 62.3.28)

13. There should be separate secretariat departments at the State level at least for agriculture, animal husbandry, fisheries and forestry in all the major States depending upon the importance of the different subjects in the State and the workload in each subject.

(Paragraph 62.4.3)

14. There should be a single officer of the States of Agricultural Production Commissioner-cum-Principal Secretary to the Government to plan, direct, guide and coordinate the various subjects within agriculture and those States where the APCs have not been appointed should take immediate steps for appointing one. The APC should be in rank only next to Chief Secretary to the State.

(Paragraph 62.4.4)

15. A senior Cabinet Minister who should be Deputy Chief Minister in the State Cabinet should be entrusted with the overall responsibility for all the subjects in the sphere of agricultural development. There could be Ministers of State in-charge of different departments, the number and grouping of subjects depending on the workload and their inter-relationship.

(Paragraph 62.4.5)

16. Where there are several technical directorates in the sub-sectors relating to agriculture/animal husbandry, the seniormost Director who may be designated as Director-in-Chief, could be entrusted with the responsibilities at the State headquarters for co-ordination. Similar arrangements should be made for fisheries where there are separate directorate for inland and marine fisheries.

(Paragraph 62.4.6)

17. There should be a separate technical directorate for extension and training at the State headquarters.

(Paragraph 62.4.7)

18. There should be a unit for planning, coordination and evaluation under the APC which will be the main instrument with him for coordinating the activities of the different secretariat departments, technical directorates and other organisations effectively. The level of expertise in the unit should be adequately high. The planning unit must work in close harmony with budget and finance unit.

(Paragraphs 62.4.8 to 62.4.10)

19. Strong planning, coordination and progress analysis cells will have to be organised under the different integrated directorates also.

(Paragraph 62.4.11)

20. There should be a budget control unit under the APC to have overall supervision over utilisation of the budget provisions. Also, each department/directorate must have its own budget cell.

(Paragraph 62.4.12)

21. There should be joint councils at the State under the respective departments comprising the subject-matter specialists under the department and the top level subject-matter experts in the various faculties in the agricultural university in the State. The councils may make periodical assessment of the state of science and advise on technical matters having policy implications.

(Paragraph 62.4.16)

22. In order to maintain technical competence in State Departments, provision should be made for exchange of staff at appropriate level between the universities and the departments on deputation

basis.

(Paragraph 62.4.16)

23. There could also be adaptive research cells at the level of technical directorates which could function in close liaison with the agricultural university.

(Paragraph 62.4.17)

24. Supply and service functions should be entrusted to institutional agencies and other alternative systems of supplies outside the departmental purview.

(Paragraph 62.4.17)

25. The extension staff of the department attending to agricultural development and promotional work should not be asked to attend to the regulatory work.

(Paragraph 62.4.18)

26. The cadre of the departments concerned with agricultural development should be built on a stable basis taking into account a total and long-term view of the additional requirements of developmental staff.

(Paragraph 62.4.19)

27. The divisional level of administration is justified only in the case of large States with a very large number of districts and regional homogeneities. Such cases, however, should be exceptional and even where divisional level is introduced, its functions should be limited to regional planning and coordination.

(Paragraph 62.4.20)

28. The secretariat or State headquarters organisations should be comparatively small and compact by due decentralisation of authority to the field level organisations.

(Paragraph 62.4.21)

29. Top management posts in the secretariat at the State level including those of Secretaries and Joint Secretaries should be held by the technical officers of the various directorates and executive departments. The post of APC should be filled from the Secretaries of the departments. A technical officer should be preferred for this post.

(Paragraph 62.4.24)

30. Technical officers should be provided the maximum opportunity for manning senior positions of management of agricultural development corporations, agencies, boards etc.

(Paragraph 62.4.26)

31. The heads of technical directorates should be granted suitable ex-officio secretariat status in order to facilitate quicker

decisions.

(Paragraph 62.4.27)

32. The various directorates connected with agricultural development should be specifically declared as technical organisations and a provision to the effect that the post of directors of these directorates should be held by technical officers alone, be incorporated in the recruitment rules.

(Paragraph 62.4.28)

33. All States should follow uniform pay scales and prospects for the agricultural cadres which should be comparable to those in the administrative service.

(Paragraph 62.4.29)

34. All Central technical posts should generally be filled by deputation from the States. The period of tenure should not be too short and may be fixed at five years. In the selection of these officers on deputation their position in the cadre and their competence rather than their pay scales should be the criteria.

(Paragraphs 62.4.30, 62.5.45 and 62.5.46)

35. An All India Agricultural Service should be formed immediately. This service should have different wings dealing with agriculture, animal husbandry and fisheries. There should, in addition, be State agricultural services, junior and senior, with provision for inducting competent persons from the senior State services to the all-India service on a quota basis.

(Paragraphs 62.4.31 to 62.4.33)

36. There should be an Agricultural and Rural Development Council at the State level under the chairmanship of the Chief Minister/Deputy Chief Minister. It will be an advisory body and will consider the basic approaches and policy issues and review the general progress of the Plan. The APC may act as the Secretary of the Council.

(Paragraph 62.4.35)

37. Separation of cooperative agricultural marketing or the NCDC from the Ministry of Agriculture and Irrigation is not justified. A service division like credit and marketing should be placed under the Department of Agriculture.

(Paragraph 62.5.7)

38. Minor irrigation and the Central Ground Water Board (CGWB) which are at present under the Department of Agriculture should be transferred to the Department of Irrigation in the interest of integrated development of surface and ground water irrigation sources.

(Paragraph 62.5.8)

39. All developmental activities in the field of fisheries should be handled by the Department of Agriculture.

(Paragraph 62.5.8)

40. Research activities handled at present by the Boards for Tea, Coffee, Rubber and Cardamom which are under the control of Ministry of Commerce should be transferred to the ICAR. Considering the need for a strong organisation of extension and development in respect of all these commodities, the extension activities also should be brought under the agricultural set-up. The Ministry of Commerce may handle the marketing aspects including exports.

(Paragraphs 62.5.8 and 62.5.39)

41. The different departments under the Ministry of Agriculture and Irrigation at the Centre should be the Departments of Agriculture, Crop Production, Animal Husbandry, Fisheries, Forestry, Irrigation, Rural Development, Research and Education and Food.

(Paragraph 62.5.12)

42. There should be a Principal Secretary in the Ministry of Agriculture and Irrigation who, besides playing the role of a coordinator should also be in charge of the Department of Agriculture which will deal with planning, budget and finance, area development programmes, agricultural credit, economics and statistics, foreign aid etc. The post of Principal Secretary should be filled by the best man available for the job irrespective of whether he is a generalist administrator or a technical expert.

(Paragraph 62.5.13)

43. The Secretaries of the Departments of Crop Production, Animal Husbandry, Fisheries, Forestry, Irrigation and Research and Education should be scientists specialised in their respective fields.

(Paragraph 62.5.14)

44. For coordination between research and development at the Central level, there should be a Joint Council consisting of Secretaries of development departments and the Department of Agricultural Research and Education with the Extension Commissioner as the convenor. The group should be presided over by the Principal Secretary of Agriculture. The Joint Council should also function as an agency for consultation, evaluation and coordination between the production divisions and extension organisations.

(Paragraphs 62.5.15 and 62.5.31)

45. There should be a well organised Planning Division under the Department of Agriculture dealing with formulation, coordination and evaluation of the plans. The Planning Division as also the budget and finance division which will work in close harmony should

be placed under the Principal Secretary of Agriculture.

(Paragraphs 62.5.16 and 62.5.21)

46. High level committees may be constituted wherever the need arises for policy coordination amongst Ministries and Departments.

(Paragraph 62.5.22)

47. It is necessary to form similar ad-hoc groups of implementation under the different departments of the Ministry of Agriculture and Irrigation in order to expedite executive actions.

(Paragraph 62.5.23)

48. The division for land reforms and land management legislation under the Department of Agriculture should be entrusted with the study of agrarian legislation and regulatory acts etc. with a view to identifying deficiencies of the existing legislation and creating consensus for model legislation.

(Paragraph 62.5.25)

49. The Directorate of Extension at the Centre which should be the source of technical guidance and advice regarding extension organisation, training and communication should be strengthened and placed in the Department of Agriculture under the Principal Secretary. The Extension Commissioner should be a technical officer of the rank of an Additional Secretary.

(Paragraphs 62.5.27 to 62.5.30)

50. There should be ultimately a full-fledged Division in the Ministry of Agriculture and Irrigation under the Department of Agriculture to look after women's programmes. To begin with, the existing Home Science and Nutrition Education Science Unit in the Extension Directorate should be converted into a full-fledged Directorate of Women's Programme and placed under the administrative control of the Extension Commissioner.

(Paragraph 62.5.36)

51. Decentralisation of powers to the directorates and the executive organisations under the Ministry of Agriculture and Irrigation should be carried out fully so that the experts in the Central departments are able to devote their entire time to professional guidance and overall direction.

(Paragraph 62.5.37)

52. There should be a standing consultative Council at the Central level for facilitating decisions on key issues having overall importance. The heads of departments or divisions or the Secretaries in-charge of agricultural departments and the representatives of the State Governments should be associated with the Council. The Council should be presided over by the Minister of Agriculture and Irrigation. Besides, there may be separate consultative groups

for agriculture, animal husbandry, fisheries, forestry etc.

(Paragraph 62.5.38)

53. The system of multiple technical-cum-administrative hierarchies in which papers have to pass through several stages before a final decision is taken must be changed and an officer-oriented system introduced in which responsibilities are clearly fixed at each level. Disposal of any case should not generally involve more than two levels.

(Paragraphs 62.5.41 and 62.5.44)

54. The Agricultural Commissioner, the Animal Husbandry Commissioner, the Fisheries Commissioner and the Inspector General of Forests should be Secretaries of the concerned departments. The Agricultural Marketing Adviser and the Plant Protection Adviser should be given the ex-officio Joint Secretary's status. The Extension Commissioner should be given the ex-officio status of Additional Secretary and the Economic and Statistical Adviser should enjoy the status of a Joint Secretary. The entire Ministry of Agriculture and Irrigation should mostly consist of technocrats with necessary administrative and management training.

(Paragraph 62.5.43)

55. The posts of Commissioners of Agriculture, Animal Husbandry and Fisheries and Inspector General of Forests-cum-Secretaries to the respective departments should also be filled on a tenure basis from amongst the competent and senior officers in the States and the Centre. Ultimately when the All India Agricultural Service is formed, senior officers from the service will be eligible for appointment to these posts. Further in the case of the Animal Husbandry Commissioner, the post should not be a close preserve of any one field; the recruitment should be made from amongst the outstanding scientists in the disciplines of veterinary science, livestock production or dairying.

(Paragraph 62.5.46)

56. It will be desirable to have smaller number of compact advisory bodies covering homogeneous groups of subjects with strictly laid down drill of meetings, reviews and follow-up action.

(Paragraph 62.5.47)

57. There should be closer working relationship between the field units under the Central and the State organisations. As a general policy, the continuance of pilot projects, model farms etc. under the Central organisations should be reviewed from time to time and those which could be transferred to the State sector should be done so immediately.

(Paragraph 62.5.49)

58. The development corporations at the Central level should not be isolated from the general development and extension set-up at the

State level and the attempt should not be to duplicate the State staff and organisation. However, the Ministry of Agriculture and Irrigation should not be directly involved in any operation of commercial nature.

(Paragraph 62.5.50)

59. The working of the administrative set-up should be reviewed periodically.

(Paragraph 62.5.51)

60. Training in agricultural administration and management should be given at the point of entry into the service both for recruits to the proposed Indian Agriculture Service as well as to the incumbents of other posts in the Central and State agricultural departments. Provision should also be made for in-service training which should be given to all within a certain period of service, say 5 to 7 years after an officer has joined duties.

(Paragraph 62.6.3)

61. Fresh recruits to the all India Agricultural Services should be given training in the same way as the recruits to the IAS and other all India services, at a Central agricultural administrative college which may be called the All India Institute for Agricultural Administration and Management. Similarly, new entrants to the State agricultural services should be given training at staff colleges at the State level.

(Paragraph 62.6.4)

62. For the purpose of in-service training the State level technical officers from agricultural assistants to the top level posts at the State level may be graded into four categories in accordance with their scale of pay, position and functions. The training courses and content may be formulated keeping in view their functions and responsibilities. Except for the officers of the rank of joint Directors and above, facilities for training of officers should be provided by the State Governments. The officers of the rank of Joint Directors and above should be provided training at the All India Institute for Agricultural Administration and Management.

(Paragraphs 62.6.5 to 62.6.11)

63. The technical officers at the Central level also should be similarly classified for providing the training facilities and the training programme and content should be decided taking into account their duties and responsibilities. The senior officers should be trained at the All India Institute for Agricultural Administration and Management whereas the junior officers could be trained at one of the State institutes.

(Paragraph 62.6.12)

FARMER'S ORGANISATIONS

1 NEED FOR SETTING UP AN ALL INDIA FARMERS' ORGANISATION

63.1.1 India is a predominantly agricultural country. About three-fourths of its people depend directly or indirectly on agriculture for their livelihood. Agriculture is indeed the base of the Indian economy. The prosperity of the country depends to a large extent on the development of agriculture and prosperity of its agricultural sector. Considerable progress has been made during the post-independence period in modernising agriculture, but much still remains to be done. The yield per unit area in many States in India still continues to be low.

63.1.2 Indian agricultural scientists have done commendable work in developing high-yielding varieties of different crops and in evolving improved methods of cultivation and agricultural practices to obtain better yields. Similarly, very good work has been done by scientists in the field of animal husbandry in respect of breeding, feeding and disease control, resulting in substantial improvement in the quality of livestock and increase in production. In fact, in the mixed farming economy there is need for expertise in all fields of production. It is ultimately the farmer who has to adopt these scientific methods in his practice of farming. For that it is necessary to stimulate a real urge and enthusiasm in the farming community.

63.1.3 From the very inception of the five year development plans, emphasis has constantly been laid by the planners and administrators on involving the farmers fully in the development projects. The First Five Year Plan stated that "participation of the people in framing and fulfilling programmes and targets constitutes the crux of development in the field of agriculture and for the promotion of social welfare". It added that "from every aspect agricultural development turns upon the extent to which the people take up the programmes with enthusiasm and are willing to work for them".

It was with a view to involving the farmers directly in the developmental effort of the country that the community development and panchayati raj institutions were set up. These institutions have proved useful to some extent in implementing the development plans with the help of the farmers but have not been able to create amongst the farmers a real urge and enthusiasm so necessary for the rapid modernisation and development of agriculture. These institutions are engaged largely in the implementation of the development schemes formulated by the Government. They are not associated with the policy making and planning wings of the Government at any stage. The enthusiasm that would have been generated in the farming community if they had also been associated with the formulation of policies and plans for the development of agriculture is now conspicuous by its absence.

63.1.4 If the farmers are to be involved fully in the plans for the development of agriculture and if a real urge and enthusiasm is to be created amongst them so that they could put their heart and soul into the developmental effort, it is necessary that there should be a strong and well-knit organisation of farmers with units at appropriate levels such as the circle, the block/taluk, the district, the State and the nation. This organisation should, on the one hand, stimulate a real urge amongst the farming community to participate effectively in the development plans to modernise and improve agriculture and, on the other, secure from the Government necessary help and assistance for them in agricultural development and protection from the other more well-organised sectors of the economy.

2 EXISTING FARMERS' ORGANISATIONS IN INDIA

63.2.1 The farmers' organisations at present functioning in the country can broadly be divided into three categories:

- (i) rural institutions set up by the Government under Statutes passed by the legislatures;
- (ii) voluntary organisations functioning with the direct or indirect patronage of the Government;
- (iii) Other voluntary organisations.

Community Development and Panchayati Raj Institutions

63.2.2 The Community Development Programme was initiated on October 2, 1952, with the object of securing people's participation in the area development plans and inculcating in them the spirit of self-

help. The panchayati raj institutions which were introduced in the late fifties were a further step towards involving people in the effort to develop rural India. The country is at present divided into about 5,400 blocks. There are nearly 218 thousand village panchayats covering about 370 millions of rural population. These institutions are spread out throughout the country and are making some contribution to the agricultural development of the country. These bodies are, however, mainly set up for the implementation of Government development schemes. They do not provide opportunities to the farmers to be fully associated with the policy making and planning wings of the Government, except in Maharashtra where the zilla parishads are directly involved in planning the programmes of rural development for their areas. But even in Maharashtra, the agricultural committees of the zilla parishads in many districts are not active. Thus, by and large, there is no democratic well-established channel through which the needs and difficulties of the farmers could be conveyed from the village level to the State and national levels so that they could be effectively placed before the State and the Central Governments. These institutions, therefore, meet only partially the requirements of the farmers.

Voluntary Organisations under the Patronage of Government

63.2.3 A number of voluntary organisations of farmers are at present functioning in the country. The broad principles, aims and objectives of these organisations can be summed up as under:

- (i) to protect, advance and promote the social, economic and cultural interests and activities of all categories of farmers and also in particular of farm youths and farm women in the country;
- (ii) to study the problems facing the agricultural producers in India;
- (iii) to undertake training and education of agricultural producers and farm families and co-operate with governmental and other agencies for the uplift of the farming community and for ensuring rapid progress of agriculture as an efficient industry and also to give wide publicity to the vital role of the farming community in national life;
- (iv) to assist the authorities in formulating and promoting national and international agricultural policies in the interest of the agricultural producers and to collaborate with similar organisations of agricultural producers in the

country and abroad for the furtherance of the said objectives; and

- (v) to take such steps for the fulfilment of the above objectives as may be necessary from time to time, particularly the collection and utilisation of funds for holding meetings, conferences, seminars and exhibitions, sending representations, deputations, memoranda, etc. and exchanging delegations with similar farmers' organisations.

63.2.4 Financial assistance is provided by the Ministry of Agriculture and Irrigation to organisations recognised by the Government for undertaking training programmes for farmers, farm women and village youths and for organising conventions and meetings of farmers besides arranging agricultural fairs and exhibitions, exchange of farm leaders and other such activities.

63.2.5 Although these voluntary organisations might be doing useful work in their respective spheres of activity, they have been able to create only limited consciousness among farmers for developing agriculture. These organisations have been functioning almost independent of one another with little or no coordination *inter se*. None of these organisations has acquired the stature and strength to speak authoritatively for the entire farming community. Resolutions passed and requests made by these organisations often do not receive serious attention of the people in authority because of the lack of organised support from the masses. The constitutions of various organisations no doubt provide for the establishment of branches at all levels, yet there has been very limited mobilisation of effort at the grass roots.

63.2.6 The following are some of the more important organisations at present functioning at the all-India level:

- (i) Bharat Krishak Samaj,
- (ii) Kisan Sabhas,
- (iii) National Tonnage Club of Farmers,
- (iv) Bharatiya Grameen Mahila Sangh,
- (v) Farmers' Federation of India,
- (vi) Young Farmers' Association.

The present position regarding the activities of these organisations is described in the following paragraphs:

63.2.7 Bharat Krishak Samaj: This organisation was established in April, 1954 on the initiative of the late Dr. Punjab Rao Deshmukh. It was obviously conceived at the national level but soon worked down to State, district, block and village levels. It has about over one million members. The organisation is non-political in character.

The main objectives of the Samaj are to protect, advance and promote the social, economic and agricultural interests and activities of the farmers, farm youths and farm women. The Samaj undertakes propaganda, training and education of the agricultural producers and farm families. The Samaj holds national conventions of farmers and meetings of the All-India Farmers' Council from time to time to achieve its objectives. During the earlier years of its existence it did useful work, but later on its activities seem to have received a setback. It has not been able to enthuse the farmers to the desired extent to put in their best to increase production, nor has it been able to influence adequately the Government to help the farmers in various ways. The financial and administrative weaknesses of the Samaj seem to be responsible for its not being able to build up the required stature.

- 63.2.8 Kisan Sabhas: The All-India Kisan Sabha was formed in 1936 under the leadership of Swami Sahajanand Saraswati. It has had a chequered career since then. Today it has a mass membership running into a few lakhs composed mainly of small, marginal and middle peasants. It has its branches in several States. Similarly, there are other peasant organisations, such as Kisan Congress and Kisan Sabha with different political affiliations and varying membership. These also have their branches in the States.

63.2.9 National Tonnage Club of Farmers: This Club was established in 1965 and has a total membership of only about 4,200. Its membership is restricted to farmers who produce a minimum of about 5 tonnes per ha in an agricultural season. The Club thus serves only the big and medium farmers. It helps the members by providing inputs and giving technical advice on methods of cultivation. The role played by the Club in the service of farmers is obviously limited.

63.2.10 Bharatiya Grameen Mahila Sangh: The Sangh was established in 1955. In 1961 it started local centres in villages to work amongst village women. The activities of the Sangh are mainly in the field of the education of farm women in the techniques of crop production, animal husbandry and housekeeping. Adult literacy and family planning are also included amongst the objectives of the Sangh. The Sangh is thus playing a useful role in educating farm women. It has branches at national, State, district, block and village levels.

63.2.11 Farmers' Federation of India: In October, 1972, another organisation called "Farmers' Federation of India" came into existence with a well thought out manifesto purporting to cater to the needs of the farming community of India almost in every walk of life and more particularly in respect of production of crops/livestock and marketing.

It appears that in spite of its laudable aims and objectives this organisation has hardly made any headway, though it is supposed to function at the national, State, district, block and village levels. The field performance of this organisation is to be watched further before any definite views can be formed on its functioning.

63.2.12 Young Farmers' Association: The Association was formed in 1956 with the objective of building up a rural youth movement so that the village youth could serve the community and help accelerate its progress and prosperity. The Association was first established at the all-India level and later on it formed branches in some of the States and districts. At the village level, the Association does not have any units of its own, but claims to have the village youth clubs, formed as a part of the community development programmes, as its affiliated bodies. However, in spite of its professed aim to build up a rural youth movement, the main activities of the Association have been to hold all-India, State and district level conventions, seminars, study tours, competitions and rallies of young farmers. At the village level, the main activities of the youth clubs have been cultural and recreational, with certain items like holding demonstrations in improved methods of cultivation thrown in occasionally. There has been very little direct involvement of the Association in any agricultural or rural development programme and its activities have been mainly of an academic nature.

63.2.13 Other Voluntary Organisations: Besides the above, there are many other organisation of different types functioning in various States. Some of these are organisations of which the members are producers of field crops, plantation crops, livestock and livestock products etc., whereas a few are meant for the supplies of various inputs required by farmers for crop/livestock production. A few of these organisations are functional in nature *e.g.* those exclusively devoted to construction and/or operation of minor irrigation works such as dug wells, tubewells, percolation tanks, etc., and comprising the beneficiaries. There are also other single purpose organisations such as those for safeguarding the interests of agricultural labourers and tenants. They play more or less an advisory role in furthering the group interests covered by them. Some of the organisations do have very laudable and specific aims such as those exclusively devoted to the upgrading of livestock by techniques of artificial insemination. In some States there are also organisations for improving the lot of young farmers and other rural youth.

63.2.14 An assessment of the actual contribution of these organisations in attaining the objectives for which they are formed, has

revealed that there is hardly any effective organisation which could claim good performance. Moreover, there are no worthwhile organisations to safeguard the interests of fishermen, tribals, village artisans and such others, though they form a big chunk of the rural population in India. It will also be noticed that among the existing organisations there is hardly any which has got clear-cut objectives to help the small and marginal farmers and landless labourers through the implementation of land reforms, tenancy legislation, etc. Experience has shown that unless the farmer is given rights in the lands cultivated by him, he would be reluctant to put his investment and effort in stepping up agricultural production. One of the main handicaps in the implementation of land reform legislation is the absence of any local organisation which will look after the interests of groups like small and marginal farmers.

63.2.15 The activities of the organisations, enumerated above, remain confined mostly to the headquarters where they are located due to the absence of proper publicity as to their aims and objectives, functioning and membership. Hence, their activities also remain more or less confined to those who somehow get to know the existence of these organisations and a vast majority of the rural population is not at all aware of them.

63.2.16 A brief study of the functioning of these organisations has also revealed the weaknesses in their financial position. Barring a few, which have either the patronage of the Government or of big farmers, they appear to be financially weak. They are not self-supporting and as such are influenced by the political party or agencies financing them. This restricts their utility in championing the cause of the farmers. A financially independent organisation would certainly be in a better position to safeguard the interests of its members.

63.2.17 Members of most of the farmers' organisations existing in the country today have had no opportunity of keeping themselves abreast of developments in the field of scientific agriculture. Nor are the facilities for training them adequate. The organisations also do not have adequate staff and other facilities for achieving the aims and objectives which they have set before themselves.

63.2.18 Lastly, there are a large number of co-operative organisations at the primary level such as milk unions, or cooperatives of growers of specific crops, such as cotton, sugarcane and several plantation crops like tea, coffee and rubber. These cooperative organisations can also be treated as non-official organisations of farmers with a common bond and economic interests. Though some of these organisations are functioning very well with regard to the specific

objectives for which they have been set up, they do not fulfil the role envisaged for farmers' organisations.

3 FARMERS' ORGANISATIONS IN OTHER COUNTRIES

63.3.1 In some of the foreign countries there are powerful and well organised associations of farmers which, on the one hand, put forward effectively the views of the farmers before the Government and safeguard the interests of the farmers and, on the other, secure the cooperation of the farmers in all matters of national importance. The organisations functioning in United States of America (USA), Denmark, Canada Morocco, Philippines, Malagasy, Republic of Vietnam, Taiwan and Japan are described briefly in the following paragraphs:

United States of America

63.3.2 In USA, four general farmers' organisations are currently operating on a nation-wide scale, viz.,

- (i) The Grange,
- (ii) The American Farm Bureau Federation,
- (iii) The Farmers' Union,
- (iv) The 4-H Clubs.

63.3.3 The Grange was organised in 1867. Although it is classified as a farm organisation, the qualification of farming is not an essential prerequisite for its membership. It is a national body with State and local branches, the latter being usually neighbourhood organisations. Any three local branches can join together to form what is called Pomona Grange. The masters of the local Grange and their wives constitute the voting delegation to the State Grange which meets annually. National Grange in turn consists of the masters of the State Granges and their wives. It also meets annually. Its objectives include the promotion of fraternal fellowship, development of agriculture from an economic standpoint and fostering wholesome and community life in rural areas. Prospective members must be over fourteen years of age.

63.3.4 The American Farm Bureau Federation was organised largely through the stimulation of the agricultural extension services of

the US Department of Agriculture and the State colleges of agriculture. Its initial function was to provide support for the work of agricultural and home demonstration agents of the country. In some of the States the country level Farm Bureau still maintains official relationship with the agricultural extension service but this is not true everywhere. The State and national organisations of the Farm Bureau, however, do not have any official relationship with the agricultural extension service. Membership is ordinarily open to any person who is interested in its objectives and is willing to pay dues. The Bureau provides a channel for the expression of members' opinion against legislation affecting the farmers. Candidates contesting the national presidential election often appear in the Bureau's convention to make statements about farm policies that they would like to promote if elected.

63.3.5 The Farmers' Union is a militant organisation with a definite economic and social philosophy. It has both country and State units. Principal emphasis in the meetings of local units is laid on economic problems although there might be social problems as well. Membership is by families. It has a youth programme with training camps and institutions. The Union maintains a vigorous lobby in the national capital city and its objectives include maintaining and protecting family-type farms, promoting cooperative purchase and marketing organisations and furthering economic interests of farmers. It has taken a stand against vertical integration in farming unless controlled by farmers.

63.3.6 Although not strictly a farmers' organisation as such, the institution of 4-H clubs has rendered a yeoman's service to farming in the USA. The 4-H club movement is an extension activity jointly conducted by the US Department of Agriculture and the State colleges of agriculture. Small neighbourhood units of boys and girls between the ages of ten and twenty-one constitute 4-H clubs. The average membership of a club ranges from fifteen to twenty-five. The main activities of the clubs relate to farming, home-making, health improvement and recreation. Nevertheless, the major emphasis in the activities of these clubs has all along been on agriculture. Consequently, the boys and girls are trained in and assigned farm projects relating to crop cultivation, horticulture, soil conservation, agricultural engineering, dairy-farming, poultry-keeping, handicrafts, etc. The method employed to develop the skills is learning by doing. Thus, young boys and girls learn modern methods of farming in their formative years and blossom into good farmers and citizens. The 4-H clubs have over 2 million members and constitute the largest rural youth movement in the world.

Denmark

63.3.7 In Denmark, besides a strong cooperative organisation which serves agriculture in its various operations, there are farmers' associations as well. The members of these associations are small and medium farmers. The bigger landowners have another association called the Committee of the Twelve. The farmers' associations render to their members a multitude of services relating to crop production, livestock farming and home-making. These associations have their own regional and national federations and are suitably interlinked from the bottom to the top of the pyramid. At the national level there is also an agricultural council which came into being in 1919 with the object of serving as the central organisation of Danish agriculture. The Agricultural Council has during the later years intensified its activities in the field of sales promotion. The Council today is responsible for the sales promotion and marketing work inside Denmark as well as outside. Its activities include the setting up of Danish Agricultural Producers' Information Service in London which has set a high standard in this type of work. The Council has carried out many measures in collaboration with other agricultural organisations including the Federation of Small Holders' Associations.

Canada

63.3.8 Farmers' organisations and cooperative enterprises were sought to be developed in Canada in the early years of the twentieth century with a view to protecting the farmers from exploitation by the traders of grain and from aggressive commercialism which put agriculture to economy disadvantage. During the two decades since 1910, serious efforts were made to form a national farmers' organisation embracing the various farmers' associations in the country. But only partial success was achieved in the formation of a Canadian Council of Agriculture in which only four provinces of the country and a few small organisations were represented. However, the Council soon became weak and ultimately defunct by late 1920s. The Great Depression, which followed and resulted in widespread distress among the farmers, provided the impetus to form, in 1935, the Canadian Federation of Agriculture (CFA) at the national level. The CFA fulfilled the long-felt need for a unified national organisation of farmers. It represented all sections of farmers throughout the country and was qualified to plead the cause of agriculture in both the national and the international forums.

Morocco

63.3.9 In Morocco, a farmers' association (Synricat Agricole) was first formed in 1956 and was named Farmers' Rights Defence Society, the name reflecting the aims and objectives of a farmers' organisation in that country. The campaign for establishing local farmers' associations was assiduously carried on from province to province and after a sufficient number of farmers' associations had been formed in a province, a Provincial Union of Farmers' Associations was also established there. Finally, an All-Moroccan Union, called Supreme Council for the Moroccan Union of Agriculture (Union Marocaine d' Agriculture), was set up in 1958.

Philippines

63.3.10 For carrying out the agricultural extension programme of the Government effectively, the Philippines Bureau of Agricultural Extension, later renamed Agricultural Productivity Commission, felt the need of a farmers' organisation. Consequently, study clubs were organised by the agricultural extension agents of the Bureau for teaching the farmers improved methods of farm production. The first such club was formed in 1954. The success of these study clubs led to the formation of farmers' clubs. From 1956 onwards, efforts were made to organise farmers' clubs throughout the country. The campaign for organising these clubs was intensified after the implementation of land reforms in 1963 and resulted in a large expansion of the clubs at the village level. These clubs were then federated into municipal and provincial units and finally into a central body called the Philippines Federation of Farmers' Extension Clubs. Since 1965 these clubs have been named associations and their central body as Federation of Farmers' Associations of the Philippines, Inc. From 1972, a special association called "*Samahang Nayan*" has been formed to serve the interests of small farmers tilling upto 7 ha of land. Its main aim is to educate them on the benefits and ways and means of effecting savings, forming their own capital, ploughing it back into agriculture, utilising the cooperative media for meeting their requirements and becoming better farmers.

Malagasy

63.3.11 The need for constituting farmers' organisations in Malagasy arose for carrying out agricultural extension work and to supply agricultural inputs to farmers and market their agricultural

produce and provide them with credit. The Government encouraged local leaders to get together and organise farmers' associations at the grass-roots' level. A beginning was made in this direction in 1962-63, when Association d' Interest Rural (AIR) or rural interests' associations began to be formed. Gradually, these associations were formed all over the country and became the most important interest group of farmers. The AIRs are voluntary associations of small farmers, stock breeders and rural craftsmen and deal with matters of economic interest to these classes. They do not involve themselves in any political activity and are engaged wholly in promoting agriculture, animal husbandry and rural arts and crafts.

Republic of Viet-Nam

63.3.12 In the wake of the partition of the country, the then Government of the Republic of Viet-Nam had to face a serious disruption of its economy, inflow of a large number of refugees from the North and shortage of essential consumer goods, including food. In its drive to rebuild the economy and enhance agricultural production, the Government promoted village co-operatives to facilitate rural development. The co-operative, however, registered very slow progress and did not succeed in removing the farmers' difficulties and impediments in the way of agricultural production. This experience led the Government to emulate the pattern of farmers' associations in Taiwan, where they had been successful. A Presidential decree was issued in December 1958 whereby farmers' associations, analogous to those of Taiwan, were sought to be constituted throughout the country. A committee known as the Central Committee for Farmers' Associations was set up to work out and execute the scheme. It also did not make much progress and was, therefore, dissolved in 1962. Instead, a directorate was formed to take charge of the work.

Taiwan

63.3.13 The farmers' organisation in Taiwan is a federated system of service associations formed by the farmers themselves for the purpose of increasing their production, improving their knowledge and skill, bettering their standard of living, developing the rural economy and promoting their general welfare. They are known as "farmers' associations" and constitute a single structural pattern through which rural life in general and agricultural production and productivity in particular are sought to be promoted. The associations are organised at the township, county and provincial levels.

There is an automatic link between the associations at the different levels since at every level it is incumbent on them to become a member of the association immediately above them. At the lowest level is the township association. It serves on an average 2,400 households. Farm families of each village within the jurisdiction of a township organise themselves into an agricultural unit. On an average, there are about 15 such units in a township association and about 160 members per unit. The agricultural unit acts as a bridge between the township association and its members and helps the association by dissemination of information to individual members and by organisation of elections. The township association renders a large number of services to its members such as purchasing, warehousing, processing and marketing their produce; supplying inputs like seeds and fertilisers; advancing production loans and providing facilities for depositing their savings; rendering technical advice and guidance on all farm matters; providing credit for their domestic needs and undertaking general welfare measures like running nursery schools, recreation centres, and adult literacy classes; promoting hygiene and sanitation and even settling disputes among its members. Thus, a farmer member while devoting all his time and attention to farm production can count on the association for rendering all possible assistance to him both for his farm business and home life improvement. All the township associations in a county are the members of the county association and similarly all the county associations are the members of the provincial association. The main function of these associations is to supervise and coordinate the activities of the lower level associations and to see that all the supplies and other facilities needed by township associations reach them on time and at the proper places so that they could render an efficient service to their members. Besides these functions, they assist the Government in formulating policies and working out plans for agricultural and rural development. The farmers' associations at all levels also act as a framework through which all schemes of the Government intended to benefit the farmers are generally routed.

Japan

63.3.14 In 1947 there were about 7,000 farmers' unions or associations in Japan, with a membership of about 2 millions. Their main efforts were directed towards seeking the abolition of the then existing system of land tenure, promoting land reforms and combating the system of compulsory levy on the produce of rice. By 1950 the Government had abolished the old system of land tenure, imple-

mented land reforms and effectively met the other complaints and grievances of the farmers. Since then the influence of the farmers associations has continued to wane. At the higher level, 4 big farmers' organisations were set up in the post-war period. The Japanese Federation of Settlers' Unions came into being in 1948, the General Confederation of Farmers' Unions in 1958, the Pan-Japanese Federation of Farmers' Union in March, 1958 and the National Federation of Farmers' Unions in 1960. However, due to the weakening of the influence of the farmers' associations at the base level, since about 1950, these organisations have been engaging themselves mainly in what may be called peripheral activities, such as lobbying in the Japanese Diet for support to the farmers' representations, trying to maintain prices of agricultural produce at levels fair to the farmers, and submitting claims to the Government for reduction of tax on agriculture.

63.3.15 From 1951, cooperative societies began to undertake a wide range of activities in the field of agriculture and gradually took over virtually all the work which had been performed by the farmers' associations earlier. A marked characteristic of the agricultural co-operative system in Japan is that it has an orderly pyramidal structure with three levels—municipal, prefectural and national. The total number of local or primary cooperative societies at the municipal level was estimated to be 11,000 in 1965. Each such society, on an average, had 536 peasant families as its members. Above this there are federations of cooperative societies at the prefectural level. There are 46 such federations, one in each prefecture. At the national level there is a Central Union of Agricultural Cooperatives. The cooperative organisation in Japan has acquired considerable influence. It is represented on all important national bodies and functions in close collaboration with the agricultural administration of the Government. In fact, since its inception the organisation has served the Government as a subsidiary administrative organ executing the latter's agricultural development programmes. The bulk of rice and wheat sold by the peasantry is marketed through the cooperative organisation and the bulk of the supply of inputs like fertilisers and pesticides to the farmers is also handled by the cooperatives. The Central Union of Agricultural Cooperatives is represented in all municipalities and prefectures and it is estimated that about half of those elected to the various assemblies in Japan belong to and act as the representatives of the cooperative movement.

63.3.16 Besides the aforesaid organisations, there are chambers of agriculture at three levels. In every village, town and local capital, there is a "Municipal Agricultural Commission", now designated

"Local Agricultural Committee". In every prefecture there is a "Prefectural Chamber of Agriculture". At the national level there is a "National Chamber of Agriculture". These bodies have been set up by the State and perform certain specific functions assigned to them by the Government. Their main functions are to apprise the Government as well as to make known to the public the views and opinions of the farmers on matters pertaining to agriculture and to carry on education and research on subjects of agrarian interest. The agricultural committees at the local level have also been assigned the task of mediation, conciliation and arbitration in the disputes among the farmers.

4 FARMERS' ORGANISATION—A SUGGESTED PATTERN FOR INDIA

63.4.1 Although a large amount of agricultural development has taken place in the country since the initiation of the First Five Year Plan, all sections of the farming community have not been equally involved in the process. The benefits from development have largely gone to big and medium farmers. The share of the small and marginal farmers, who constitute nearly two-thirds of the rural households, has been woefully small both in the adoption of new farm technology and the grant of financial assistance. The position of agricultural labourers has been worse. Even among the large and medium farmers, all have not benefitted uniformly. Those of them who could manipulate the levers of power and bring to bear influence on the officials have benefitted most.

63.4.2 One of the reasons for this lop-sided development has been the absence of a well-knit farmers' organisation which could inculcate among all sections of farmers a strong urge for modernising their farming on the one hand and provide them with the necessary wherewithal in time and with ease on the other. While a large number of voluntary organisations of farmers have been functioning in the country, there is hardly any which could claim a good performance in the field. Most of them have been subsisting on Government grants and engaging themselves either in tendering advice to their members as to how to avail of the facilities offered by the Government, or running some kind of a training course or championing the cause of sectional interests. A professionally competent and ideologically committed organisation which could motivate all sections of farmers towards planned economic growth, organise action at individual as well as group levels in furtherance thereof and provide the necessary supplies and services has been conspicuous by its absence.

63.4.3 There is, therefore, need for setting up a strong and competent organisation of farmers which can undertake all these

functions directly. At present, these are being performed largely by the Government. The motivation of farmers and the preparation of individual plans of development for every family are attended to by the Village Level Worker (VLW), technical advice and guidance—which of late have tended to become more intensive and complex—being given by the Extension Officers stationed at the block level and the supply of inputs made partly by cooperative societies and partly by Governments seed stores. This is hardly a satisfactory arrangement. In the first place, motivation, which is the most crucial and difficult part of the job is left to the VLW who is the lowest functionary in the official hierarchy and not quite competent for this kind of work. Besides this, he has 2,000 to 2,500 families in his charge and, obviously, cannot have enough contact or build up proper rapport with every one of them so as to be able to enthuse or prepare a plan for it. Therefore, his efforts in this direction are generally casual and perfunctory and do not add up to anything significant or substantial. This is an area where a farmers' organisation can do much better than any official, however well-placed. By mutual discussions and deliberations it can motivate and persuade its members to take to planned economic development as well as help prepare individual farm plans much more easily than an official agency.

63.4.4 Secondly, the technical guidance given from the block level tends to be very tenuous and diffused because of a large area to be covered by a single extension officer. Besides this, the extension service is not at all coordinated with the supply of inputs, custom service etc., which are provided by an altogether separate agency or agencies. As a result, the farmer generally does not get a good service. The extension service needs not only to be decentralised but also to be properly linked with supply and other service arrangements so that a quick, efficient and well coordinated service is available to all the farmer families. A Government organisation is hardly ever able to provide a good consumer service. It generally functions in an impersonal, routine and indifferent manner, whereas a farmers' organisation will have a direct involvement, stake and interest in the welfare of its members. It will also be less burdened with procedures and methods of work and a hierarchy of officials than a Governmental set-up. It will thus be able to render a much better service to the farmers than a Government organisation.

63.4.5 A Government organisation deals with individual farmers in any programme of area development, whereas a farmers' organisation represents the whole area and becomes its common spokes-

man. It has also a much more intimate knowledge of the area and the problems of its people than the Government. It will, therefore, be more expedient for the Government to deal with a farmers' organisation than with the individual farmers. A farmers' organisation will also be able to instil a sense of belonging among its members to a group of identical interests and inspire in them confidence in its efficacy to champion their cause collectively. This will encourage them to adopt modern farm practices by arousing in them a sense of participation in a common endeavour.

63.4.6 The initiation and growth of the farmers' organisations in some of the foreign countries, analysed in the previous Section, also suggest that the best way to motivate farmers to adopt modern methods of farming and increase their production and productivity is through their own organisations. In Philippines, Malagasy and Taiwan, whose examples are more relevant to us than those of the developed countries, farmers' associations have been the main instrument in imparting knowledge of modern farm practices, developing the skills and building up the enthusiasm and perspective of the farmers for increasing their production. A similar role is envisaged for a farmers' organisation in this country. It will address itself mainly to the tasks of motivating, educating and training the farmer for efficient performance in the field of farm production and for achieving a higher standard of living.

63.4.7 It is also observed from the experience of 'foreign countries that the organisations which grew up from the grass-roots did a real service to the farmers rather than those handed down from above. In Morocco, which has similar problems like ours, local associations were first formed by campaigns and then only their provincial and central units formed. In Philippines, it was the local study clubs which developed into farmers' associations and then federated into higher level bodies. In Taiwan, the entire structure, which has distinguished itself remarkably in boosting up agriculture and allied industries, was built up from the bottom. In some of the Western countries too, the organisations were started from the base level and then they worked their way up. On the contrary, in the Republic of Viet-Nam an attempt was made to start the process from above. A central committee was set up to work out and execute the scheme. It did not make much headway and had to be dissolved. The lesson one can draw from this experience is that only those organisations which have their roots in the people have a chance to succeed. This is particularly relevant for a country of the size and dimension of India.

63.4.8 In view of the aforesaid it is our considered opinion that a farmers' own organisation can further the interests of agricultural development as well as those of the farming community much more effectively and resolutely than a Government organisation. It will, however, be desirable if the farmers' organisation operates in two separate but complementary wings—one dealing with economic and service functions and the other with what may be broadly called promotional and welfare activities. We have recommended in Chapter 55 on Credit and Incentives that farmers' service societies (FSS) be formed at the block level with branches at the circle level for the purpose of making available to the farmers all necessary inputs, custom services, technical advice and guidance, supporting services for storage, transportation, processing and marketing and credit. The FSS will constitute the economic wing of the farmers' organisation. The other wing may be suitably named. We suggest that at the primary level it may be called Farmers' Union (FU) or Krishak Sabha.

63.4.9 A detailed description of the constitution, functions and the manner of working of the farmers' service society has been given in Chapter 55 on Credit and Incentives. The composition, functions etc. of the FU and its corresponding bodies at the district, State and national levels are discussed below:

Farmers' Union or Krishak Sabha

63.4.10 The Farmers' Union or Krishak Sabha will operate over the same area as an FSS, i.e. a block or a circle covering a population of ten to twelve thousands to start with. All those who are members of the FSS will be members of the Farmers' Union except those who are members of the FSS by virtue of their being persons rendering rural services. It is necessary to exclude the latter group from the membership of the FU as many of them would be employees of organisations like the zila parishad, panchayat samiti, education and health departments, etc. While it may be all right for them to be members of a cooperative society like the FSS, it will be embarrassing to them to be members of the FU which might champion the cause of its members with the same organisations of which they are employees. The membership of the FU will, thus, consist of farmers, artisans and agricultural labourers who are members of the FSS.

63.4.11 The executive of the FU will be called Executive Committee and will consist of upto eleven members. Seven of these will be the same as the elected members of the FSS, i.e., five representing the small and marginal farmers and two others. Four will be co-
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opted members, one each representing landless agricultural labourers, artisans, women and scheduled castes and tribes, provided none from among these classes is represented in the elected members. If represented, the number of coopted members will be correspondingly less. The executive committee, of the FU will elect a President and a Secretary from among its members, who will be the President and the Secretary of the Union also. The FU will be a registered body under the Registration of Societies Act.

63.4.12 The main functions of the Farmers' Union will be as follows:

- (i) to motivate all members towards planned economic development; for this purpose, the Union will hold meetings of specific interest groups of its members, such as farmers, agricultural labourers and artisans, explain to them in detail the objectives and *modus operandi* of the relevant programmes of development, draw pointed attention to the benefits of the programme to an individual and exercise all persuasion and reasonableness to make him adopt the programme. In short, the motivational effort will assume the form of an intensive orientation of every member;
- (ii) to mobilize the necessary material and manpower resources for the purpose of achieving the objectives of the various development programmes and fulfilling the targets laid down therein;
- (iii) to educate all members on the various progressive measures being undertaken by the Government for the benefit of farmers and other sections of the village people, such as land reforms, tenancy laws, consolidation of land holdings, fixation of minimum wages, etc.;
- (iv) to disseminate information among all members on modern methods of cultivation/production and the latest results of scientific research in their respective fields and encourage them to adopt these;
- (v) to organise training of the different occupational groups of members in improved methods and techniques of production so as to equip them for better performance in their respective fields;
- (vi) to help resolve the difficulties experienced by the members in respect of increasing their production and productivity by taking up the matter with appropriate quarters;

- (vii) to advocate and champion all legitimate causes and interests of the members with the appropriate authorities in order to help them realise their aspirations;
- (viii) to undertake directly welfare activities for the members and their families, such as running an adult literacy centre, a women's welfare centre, a youth club, a consumers' store, etc.; and
- (ix) to act as a liaison body between the Government agencies at the block and lower levels and the farmers and other sections of the people of the area represented by the Union for the purpose of consultation and cooperation between the two.

63.4.13 The Farmers' Union will be a non-political, non-sectarian body devoted wholly to the cause of the farmers and other sections of the village people. It will engage itself only in the activities intended to advance the interests of agriculture and allied occupations and the welfare of its members. The finances of the Union will consist of a graduated membership fee collected annually from its members like the old chowkidari system, a contribution made by its counterpart FSS from out of its profits, and if necessary, a levy on quantities of produce marketed through the societies.

District Farmers' Union or Zila Krishak Sabha

63.4.14 The next tier of the farmers' organisation representing the farmers' unions will be at the district level and may be called District Farmers' Union (DFU) or Zila Krishak Sabha. When a sufficient number of farmers' unions are formed in a district, they will federate into a union at the district level. The DFU will consist of the Presidents of all the farmers' unions in the district or in place of the president a duly elected representative and coopted members representing landless agricultural labourers, village artisans, scheduled castes and tribes, and women, if these classes are not represented among the elected members. If they are, the number of coopted members will be correspondingly less. The DFU will broadly correspond to the District Union of Farmers' Service Societies at that level.

63.4.15 The main functions of the DFU will be as follows:

- (i) to establish a regular channel of communication between the village community, as represented by the Union, and the district planning authorities so as to present one's point of view before the other, understand and appreciate each others' points of view and evolve, in due course, an

- identity of approach to programme planning;
- (ii) to assist the district planning body in preparing programmes of development for agriculture and allied industries. With its intimate knowledge of the conditions in the countryside, it will be possible for the DFU to bring to bear a practical approach to programme planning and help avoid the pitfalls which lie in a doctrinaire or bureaucratic approach, such as the fixing up of unrealistic, arbitrary or too ambitious targets;
 - (iii) to help implement the various development programmes through the good offices of the farmers' unions;
 - (iv) to help organise training courses for farmers and other occupational groups in improved methods and techniques of production;
 - (v) to resolve with the help of the district authorities the difficulties experienced by the farmers' unions in getting the support and cooperation of the various official agencies in their activities; and
 - (vi) to supervise and coordinate the working of the farmers' unions.

63.4.16 The District Farmers' Union should be a strong organisational unit as agricultural planning will be done mainly at the district level and the farmers' organisation has to actively assist the district planning machinery and place before it the farmers' point of view. For organising the activities of the DFU, the needed finance may be raised from the following sources:

- (i) a regular, annual contribution from the FSS, as even at present part of the funds of the cooperative societies can be used for social activities;
- (ii) levy on agricultural produce marketed through the FSS;
- (iii) grants from regulated market committees in the district; and
- (iv) a matching grant from the Government equivalent to the amount collected by the union.

63.4.17 The size of the DFU will depend upon the number of the farmers' unions in the district. It is, however, recommended that a DFU should be constituted only after a minimum of 15 farmers' unions are formed in the district. It will be expedient to have a small, compact executive committee of the District Farmers' Union for attending to its supervisory and coordinating functions and organisational matters, when the number of farmers unions participating in the DFU is large. The executive committee will be elected by

the Union from among its members. The executive committee will elect a president and a secretary from among its members, who will be the President and Secretary of the DFU also.

63.4.18 It will be seen that we have recommended cooption from among certain classes of people, as mentioned above, both to the executive committee of the farmers' union and the DFU. This has been done for special reasons. Taking the case of women it is felt that their interests are generally neglected by a corporate body unless they are represented on it to champion their own cause. Although women constitute half the farming population and perform a greater number of and more diverse tasks than their menfolk, their representation on bodies like the cooperative society, the village panchayat, the farmers' forum, etc., is negligible. According to 1971 Population Census, 87 per cent of the female work force in rural India is engaged in agriculture. A matter of particular concern relating to female rural workers is the lower wages they receive for equal work while they are often relegated to those activities which are unskilled or semi-skilled. Further, whenever modern methods of cultivation are introduced in an area, the tendency is to leave women out of the training programmes. Women are, therefore, not only displaced from the kind of jobs which men and machines take over but are also deprived of learning new skills. In order to safeguard their interests in all matters affecting them directly such as assignment of farm work, payment of wages, training and education in improved methods of cultivation, etc. it is considered necessary that women should have a representation in the farmers' organisations at all levels. As the chances of their being returned in an open election are not always bright, we have recommended that women be coopted to the executive committees of the FU and the DFU. This will operate in case women are not elected to these bodies.

63.4.19 Agricultural labourers are economically the weakest section of the village community and, barring the Marginal Farmers' and Agricultural Labourers Programme areas, have virtually no representation in any village organisation, be it cooperative, panchayat or any other body. Their interests, therefore, generally go by default. In order that they could have a say in matters affecting their interests such as their employment, wages, credit and other facilities for their subsidiary occupations, including cultivation, it is necessary that they are represented in a farmers' organisation which will champion their cause also. Since their membership of the FSS which will automatically entitle them to be members of the Farmers' Union, is not likely to be large, initially at least, the chances of their

being elected to the executive committee of the FU or the DFU are limited. We have, therefore, recommended their cooption to these bodies.

63.4.20 A large majority of the scheduled castes and scheduled tribes are incidentally agricultural labourers. Their position is, therefore, doubly weak, i.e., both economically and socially. Even when they are cultivators by principal occupation, they are generally small or marginal farmers. However, their greatest handicap is their low social status and, being coupled often with a weak economic position, it renders them incapable of securing a fair representation in any organisation through the process of election. We have, therefore, recommended their cooption.

63.4.21 The village artisans are a distinct entity in the rural economy and, therefore, deserve a separate representation in a farmers' organisation. The experience of the working of the rural industries projects has shown that unless the artisans are well-organised there is little chance of their getting a fair deal both in the supply of essential raw materials, like yarn, leather, etc., and the marketing of their products. Since most of the village crafts are either ancillary to agriculture or otherwise dependent on the prosperity of the cultivators who constitute the bulk of the customers, it is only appropriate that the village artisans are enrolled as members of a multi-purpose farmers' organisation which will look after their interests also. However, as their number in the village community is generally much smaller than the farmers or the agricultural labourers, the chances of their being elected to the executive FU or the DFU are very much limited. We have, therefore, recommended their cooption to these bodies. This will be operative only if the artisans are not returned to these bodies in an election.

63.4.22 The scheme of cooptions has been guided by two considerations. Firstly, the weaker sections of the community should be represented on the elected bodies of the farmers' organisation at the field and district levels so as to be able to safeguard their interests and champion their causes through these forums. Secondly, as the majority of the members of these sections of the community will not be farmers, the chances of their being returned in an open election to the executive committee of FU or the DFU will not be very bright. There must, therefore, be some other device to secure their representation in these bodies. This is sought to be done through the scheme of cooptions.

63.4.23 As regards small and marginal farmers, it has already been stipulated in our scheme that about two-thirds of the elected

members of the executive committee of a FU will be from among these classes. As these classes will have a two-thirds majority among the elected members of all the farmers' unions in a district, they are expected to have a majority in the DFU as well. It has, thus, been ensured that the proposed farmers' organisation represents the interests of the small and marginal farmers and other weaker sections of the village community and is not dominated by the large and medium farmers.

State Farmers' Union or Rajya Krishak Sabha

63.4.24 When a sufficient number of district unions are formed in a State, they can form a State Farmers' Union (SFU), representing the district unions at the State level. The SFU will consist of the presidents of all the district unions or in place of the president a duly elected representative. The SFU will elect a president and a secretary from among its members. The President will be incharge of the work of the Union and the Secretary will attend to its secretarial work. Its main functions will be as follows:

- (i) to apprise the concerned development departments of the State Government of the needs, expectations and opinions of the people in the rural areas in respect of the development of agriculture and allied sectors of the economy; general and specific rural development programmes; and welfare measures like land reforms, tenancy laws, etc.;
- (ii) to seek the good offices of the State Government in implementing the various development schemes and welfare measures expeditiously;
- (iii) to assist the State Government in formulating a proper policy for rural development, with special emphasis on agriculture; and
- (iv) to secure the assistance and cooperation of the various State level organisations in promoting development of agriculture and allied fields and general rural development through the medium of the farmers' unions and their district unions.

63.4.25 As the functions of the SFU will be mainly advisory and consultative, it does not need to have much money for its activities. The small amount needed by it should be available from contributions from the district unions and a matching grant from the State Government.

The National Farmers' Union or Rashtriya Krishak Sabha

63.4.26 The farmers' organisation at the all-India level should take the form of a National Farmers' Union (NFU) analogous to that of SFU. The presidents of all the State unions or in place of the president a duly elected representative will constitute the NFU. The NFU will have an advisory and consultative role in the formulation of national policies with regard to the development of agriculture and allied sectors of the rural economy, general rural development and the progressive welfare measures like rural housing, land reforms, debt redemption, etc. The NFU will elect a president and a secretary from among its members. The President will be incharge of the work of the Union and the Secretary will look after its secretarial work. Contribution from the State unions and a matching grant from the Government of India will be adequate to meet its modest financial requirements.

5 REPRESENTATION

63.5.1 It has been suggested in the preceding section that the farmers' organisations at the State and national levels will function mainly in an advisory and consultative capacity and help the Central and State Governments in the formulation of appropriate policies with regard to the development of agriculture and allied sectors of the rural economy. It is, therefore, considered expedient if a representative of the national and State level farmers' organisations is also associated with such other organisations as are engaged in promoting the development of agriculture and related industries. We recommend that the NFU should be associated with the Food Corporation of India, National Seeds Corporation, Central Warehousing Corporation, State Farms Corporation of India and other similar bodies, by the Unions' representative being coopted a member of the board of Directors or otherwise. The Union should also be represented on the panel of farmers of the Agricultural Prices Commission.

63.5.2 Similarly, at the State level, the SFU should be associated with State agro-industries corporation, State electricity board, State land mortgage/development bank, apex cooperative bank and similar other organisations.

63.5.3 The main job of the representatives of the farmers' organisation in the aforesaid bodies will be to apprise their managements of the needs and expectations of the people in the rural areas and

the possibilities that exist there in respect of the development of agriculture and allied sectors of the economy and help evolve proper policies for framing and scheduling their programmes in these respects. We suggest that these representations should be given only after the State and National level Unions are organised and fully developed as effective institutions reflecting the views and aspirations of the rural people.

6 SUMMARY OF RECOMMENDATIONS

63.6.1 The important recommendations made in the text of this chapter are given below:

1. A farmers' own organisation can further the interests of agricultural development as well as those of the farming community more effectively than a Government organisation. It will be desirable if the farmers' organisation operates in two separate but complementary wings, one dealing with economic and service functions and the other with promotional and welfare activities. For the former, we have recommended in Chapter 55 on Credit and Incentives the setting up of farmers' service societies. For the latter, we recommend the setting up of FU or Krishak Sabhas:

(Paragraph 63.4.8)

2. At the primary, level, the Farmers' Union (FU) will cover the same area as a Farmers' Service Society (FSS), i.e. a block or a circle with a population of ten to twelve thousands, to begin with. The membership of the FU will be open to all farmers, artisans and agricultural labourers who are enrolled as members of the FSS.

(Paragraph 63.4.10)

3. The main functions of the FU will be to motivate all members towards planned economic development, disseminate information on modern farm and other production practices, organise training in improved methods and techniques of production and help achieve the objectives of the various development programmes and the targets laid down therein. It will also undertake welfare activities, such as running adult literacy classes, youth clubs, consumer stores, etc.

(Paragraph 63.4.12)

4. The finances of the FU will comprise a graded membership fee collected annually from all its members, a contribution made by its counterpart FSS and, if necessary, a levy on the produce marketed through the societies.

(Paragraph 63.4.13)

5. When a minimum of 15 Farmers' Union are formed in a district, they will federate into a District Farmers' Union (DFU). The main functions of the DFU will be to establish a regular channel of communication between the village community, as represented by it, and the district planning authorities, assist the latter in programme planning, organise training courses for farmers and other interest groups and help implement the various development programmes through its constituent units.

(Paragraphs 63.4.14, 63.4.15 and 63.4.17)

6. The finances of the DFU will consist of an annual contribution from the farmers' service societies in the district, a levy on agricultural produce marketed through the FSS, grants from regulated market committees in the district and a matching grant from the Government.

(Paragraph 63.4.16)

7. In order to safeguard the interests of the weaker sections of the community like women, agricultural labourers, scheduled castes and tribes and the special interest group of artisans, they should have their representatives in the executive committee of the Farmers' Union and the District Farmers' Union through cooption, if they are not represented among the elected members of these bodies.

(Paragraphs 63.4.18 to 63.4.21)

8. The Executive Committee of the FU will be same as the elected members of the Managing Committee of the FSS, about two-thirds of whom will be from the small and marginal farmers. Consequently, these classes will have a majority in the District Farmers' Union as well. It has, thus, been ensured that the proposed farmers' organisation will largely represent the interests of small and marginal farmers and other weaker sections of the village community.

(Paragraphs 63.4.11 and 63.4.23)

9. After a sufficient number of District Farmers' Unions are formed in a State, they can form a State Farmers' Union (SFU). The main functions of the SFU will be to apprise the State Government of the needs, expectations and opinions of the people in the rural areas in respect of the development of agriculture, general rural development and welfare measures and to assist the State Government in formulating a proper policy for rural development, with special emphasis on agriculture.

(Paragraph 63.4.24)

10. The farmers' organisation at the all-India level will take the form of a National Farmers' Union analogous to that of SFU. It will have an advisory and consultative role in the formulation of national policies with regard to general rural development,

development of agriculture and progressive welfare measures like rural housing, debt-redemption, etc.

(Paragraph 63.4.26)

11. Since the National and State farmers' unions will function mainly in an advisory and consultative capacity, it will be expedient if they are represented also in other organisations engaged in promoting the development of agriculture and related fields of the economy, such as the Food Corporation of India, National Seeds Corporation, the Central Warehousing Corporation, etc. at the national level and the State agro-industries corporation, State electricity board, State land mortgage development bank, etc. at the State level.

(Paragraphs 63.5.1 and 63.5.2)

12. The main job of the representatives of the farmers' organisation in the aforesaid bodies will be to apprise their managements of the needs and expectations of the people in the rural areas and of the possibilities that exist there in respect of the development of agriculture and related fields of the economy and help evolve proper policies for framing and scheduling their programmes.

(Paragraph 63.5.3)

INTERNATIONAL COOPERATION

1 INTRODUCTION

64.1.1 Reporting towards the end of sixties, the Commission on International Development stated that international cooperation for development over the last twenty years has been of a nature and on a scale new to history. It has now been generally accepted that the aim of the policy should be to enable as many developing countries as possible to participate by the turn of the century in the international economy as self-reliant partners and to finance the investments and imports needed for sustained and accelerated growth without foreign capital on concessional term.¹ The International Strategy for Development in the Second United Nations Development Decade and the adoption by the UN General Assembly in its preliminary meeting in May, 1974 of the Resolution on New International Economic Order have added new dimensions in international cooperation in the coming years among the developed and developing countries. The Programme of Action on the establishment of a New International Economic Order adopted by the General Assembly emphasises the crucial role of collective self-reliance and growing cooperation among developing countries.

64.1.2 India has been a beneficiary of international cooperation for development. Since the beginning of the planning era there has been an increasing flow of both foreign capital on concessional terms and technical assistance reaching the peak by the end of the Third Five Year Plan. Thereafter a policy for accelerating the country's progress towards self-reliance was more consciously pursued.

64.1.3 During this period India has been able to extend both aid and technical assistance to several neighbouring developing countries bilaterally and through technical cooperation machinery of United

¹Partners in Development (1969) p. 17, Praeger Publishers, London.

Nations System. From a very early stage, the policy of international cooperation of India was one of equal partnership and of two-way traffic. In the last quarter of the century, consistent with the policy of achieving self-reliance, the country's requirements of foreign assistance would vary according to the magnitude and nature of the projects and programmes, particularly for development of agriculture for eradicating mass poverty. In this chapter on the basis of the recommendations made in the concerned chapters a synoptic view of the country's requirements is indicated. Also, to the extent possible the country's capability to offer assistance to developing countries in Asia and Africa has been projected.

2 REVIEW

64.2.1 The first official announcement regarding the need for foreign capital to supplement Indian capital resources was made by the Government of India in the Industrial Policy resolution of April 6, 1948. Further in July, 1949, the Central Advisory Council of Industries recommended that the Government should take early steps to encourage the inflow of foreign capital. Similarly, in the field of agriculture the need for foreign aid and technical assistance to supplement indigenous effort was recognised by the Government and measures were taken to channelize such assistance into Indian agriculture.

64.2.2 Foreign aid for agricultural development is received under various multilateral and bilateral programmes as well as from voluntary agencies like People's Action for Development, Rockefeller Foundation, Ford Foundation, etc. It consists of financial, technical and commodity assistance. Financial assistance is available in the form of grants and loans to be repaid in foreign exchange, rupee counterpart and commodity exchange, whereas technical assistance is in the form of fellowships, experts and ancillary equipment. The commodity assistance is mainly available in the form of supply of foodgrains, fertilisers and pesticides, etc. India has been the recipient of aid flowing under all the three categories. India has also rendered financial as well as technical assistance to several developing countries in the field of agriculture under the Indian Technical and Economic Cooperation Programme, the Colombo Plan and the Special Commonwealth African Assistance Plan. These programmes also cover deputation of technical experts and provision of training facilities in India in various fields, agriculture being one of them. A brief

review of foreign assistance received by India and aid given by her to various countries for agricultural development is given in this section. The review highlights some of the assistance programmes and is intended to illustrate the main direction of aid rather than be a complete inventory in respect of both countries/agencies and programmes.

Multilateral Programmes

64.2.3 Food and Agricultural Organisation: India's relations with the Food and Agriculture Organisation of the United Nations (FAO) date back to its very inception in October, 1945. India is at present a member of almost all the important organs of the FAO and all through she has remained an active member of the FAO. Besides participating in all the important seminars, symposia, meetings, conferences, etc., organised by the FAO, India has been receiving a large number of technical experts from the FAO in the various branches of agriculture and allied fields like animal husbandry, fisheries, forestry, etc. The FAO has also been giving fellowships to Indian agricultural scientists for specialised training abroad. Indian experts are also working in several FAO projects in other countries.

64.2.4 World Food Programme: The World Food Programme (WFP) is a multilateral food agency jointly sponsored by the United Nations and the FAO. The resources for the agency are generated by contributions, in cash and commodities, pledged by member countries. India has been an active participant in and one of the major beneficiaries of this Programme. Up to 1975-76 the Programme has committed assistance for 47 projects in India costing \$ 306.7 million. India, on her part, has pledged to the WFP a total amount of the order of \$ 4.75 million, one third of which is in cash and the balance in commodities. Assistance has been received by India for livestock, poultry and dairy projects—of which milk marketing and dairy development under Operation Flood is the most important, food-for-work projects, institutional feeding projects and emergency relief operations connected with drought and flood relief, etc. Since the inception of the Programme in India, 15 projects—6 livestock, poultry and dairy projects, 4 food-for-work projects and 5 emergency projects have been completed. Thirtyone projects with a local contribution of \$ 274 million from the WFP are under implementation. These include 4 development projects, viz., "Sone High Level Canal Project" in Bihar, "Ukai Dam Project" and "Mahi-Kadana Irrigation Project" in Guja-

rat and "Rajasthan Canal Project (Expansion)". These four projects became operational in 1975 with assistance amounting to \$ 15.7 million.

64.2.5 United Nations Development Programme: The United Nations Development Programme (UNDP) has, through its special Fund projects and Technical Assistance programmes, assisted India by making available the services of technical experts in various fields including agriculture, machinery and equipment needed for development, fellowships for training as well as assistance for conducting feasibility studies, pre-investment surveys, commodities studies, research surveys, etc. A wide variety of activities relating to crop and water development, horticulture, animal husbandry, fishery, forestry, agricultural education, etc. has been covered under the programme of assistance. Under Country Programmes introduced in 1972, UNDP assistance is allocated for 5 years and closely related to national development objectives. On this basis, the UNDP approved an allocation of \$ 50 million in 1972 for assistance to India for the period 1972-76. Out of this, an amount of \$ 10.5 million was earmarked for agriculture.

64.2.6 Several important agricultural projects have been completed with assistance from the UNDP. Mention may be made of groundwater survey in Rajasthan, establishment of 4 logging training centres, grassland and fodder development, improvement of milk production in Calcutta area, sheep and wool development in 8 States, pre-investment survey of fishery harbours, fisheries training institute, Bombay, post-graduate agricultural education and research and farmers training and functional literacy. Among the ongoing projects are nuclear research in agriculture, pelagic fisheries investigation on the south-west coast, groundwater survey, strengthening of the Central Plan Protection Training Institute, Hyderabad, grassland and fodder development project and soil and water management, Chambal area:

64.2.7 United Nations International Children's Emergency Fund (UNICEF): The UNICEF has assisted India in the milk preservation schemes mainly with a view to making milk available at a low price to the needy children and to the vulnerable sections of the society such as people in the low income group, expectant and nursing mothers and school students. It has supplied dairy equipment worth \$9.67 million and Rs. 90.6 lakhs under rupee reimbursable procurement for 14 milk schemes in India. In addition, it has provided equipment to the National Dairy Research Institute, Karnal, for training in dairy farming. All these projects have been completed.

At present two UNICEF assisted projects are under implementation. These are the Expansion of Milk Conservation Schemes at Bombay, Calcutta, Delhi and Madras, with assistance of the value of \$ 0.94 million, and the Project for Higher Education in Food and Nutrition in Agricultural Universities and Colleges, entailing an assistance of \$ 0.36 million from the UNICEF. The UNICEF has also been playing an important role in the Applied Nutrition Programme (ANP) in collaboration with the FAO and the WHO. The UNICEF's assistance to the ANP consisted of the supply of basic equipment and components for the production of nutritious foods, provision of stipends for training and assistance in certain other fields. Until March, 1974, 1,181 blocks were covered by the ANP. In the Fourth Plan the UNICEF's assistance was \$ 27,500 per block and about \$ 6,650 per training institute over a period of five years.

64.2.8 World Bank Group: The World Bank was set up on the recommendation of the Bretton Woods Conference (1944) for the grant of loans of long maturity to member nations with the object of reconstructing the economies destroyed by war, and encouraging the development of productive facilities and resources in less developed countries. Two financial affiliates of the Bank have been established since then: the International Finance Corporation (IFC) in 1956 to provide funds for private investment and the International Development Association (IDA) in 1960 to provide a source of low interest development capital for the poorer nations. India is a founder member of both the World Bank and the IDA and has received substantial assistance advanced by the IDA. The World Bank is also the Chairman of the Aid India Consortium which was formed to coordinate bilateral economic assistance to India.

64.2.9 India has been availing of assistance from the World Bank Group since 1949 for both the public and private sectors. Before IDA was established, lending by World Bank for agriculture formed only 3 per cent of the total lending for all sectors. During 1961-62 IDA made available six credits totalling \$ 56 million for irrigation and flood control. But during the 8 years that followed the bulk of lending by the World Bank Group was again for sectors other than agriculture. In the late sixties lending for agricultural sector was resumed by the World Bank. In a period of six years ending June, 1975 the Bank Group advanced loans or credit of \$ 916 million for 28 projects of which 26 are on going.

64.2.10 The thirst of World Bank assistance was initially directed to farm development programmes like exploitation of ground-water, use of improved implements, purchase of tractors and land

levelling. The loans for these purposes took the form of statewide agricultural credit projects and funds were made available to the land development banks or commercial banks through the Agricultural Refinance and Development Corporation (ARC). There have been 10 such projects with a total lending of \$ 320 million. Another important programme financed by the World Bank Group has been surface water development. Two credits for irrigation projects, \$ 35 million for the Mahi-Kadana project in Gujarat and \$ 39 million for the Pochampad project in Andhra Pradesh, have been followed recently by a number of loans or credit for improved utilisation of water on existing irrigation projects or those under construction. The World Bank has financed three such projects: Chambal Irrigation Project in Rajasthan, Chambal Command Area Development Project in Madhya Pradesh and the Rajasthan Canal Command Area Project. Several other projects are under preparation for improved water utilisation.

64.2.11 The World Bank Group credits have been provided for a number of other miscellaneous programmes including seed development, improved marketing, etc. In this lending, channelling of funds to the poorer sections of the farming community is becoming increasingly important. Three projects for dairy development in Karnataka Madhya Pradesh and Rajasthan have been financed by the Bank. In these projects the emphasis is on cattle development through small farmers. Similarly the project designed to increase and stabilise production in six of the drought prone districts in western and central India indicates the new direction in the lending; so also is an agricultural development project in West Bengal, the first of a number of projects aimed at increasing foodgrain production in the main monsoon rice areas of north-eastern India.

Bilateral Programmes

64.2.12 Australia: Under the Colombo Plan, Australia granted 322 fellowships to Indian personnel for training abroad during 1951—73 and provided a \$ 0.98 million worth of aid in the form of dairy equipment and skim milk powder for various milk schemes/public sector dairies in India during 1959—70. Australia has also assisted India in supporting the crossbreeding programme underway by making available Jersey and Holstein-Friesian cattle in seven consignments between the years 1968 and 1974. A total of 1,677 animals have so far been received from Australia of which 100 are Holstein-Friesian and the rest Jersey cattle. An agreement was concluded between the Government of India and the Government of 3 Agri—20.

Australia on April 1, 1969 for the implementation of an Indo-Australian Sheep Breeding Project at Hissar (Haryana). Australia's contribution for this project is Rs. 125 lakhs and that of India Rs. 176 lakhs for a period of seven years from 1969 to 1976. The project has helped to establish a 4,000 herd of pure-bred Corriedale sheep. Two Indo-Australian Cattle Breeding Projects, one at Hissar in Haryana and the other at Barpeta in Assam have been set up with Australian assistance for which an agreement was concluded in 1974. The total assistance received in the shape of machinery and equipment from Australia for the two projects up to April 30, 1975 amounted to Rs. 49.60 lakhs and Rs. 32.58 lakhs respectively. Australia has supplied 10 units of atomic spectrophotometers for use in the micronutrient research projects in various research institutes under the ICAR. In 1974 Australia has supplied 208 tonnes of sunflower seed to India.

64.2.13 Canada: As a participant in the Colombo Plan, Canada is one of the oldest aid giving countries to India. A wide range of machinery and equipment and technical assistance have been provided by that country for various development projects. A counterpart fund of Rs. 142.76 crores generated by the sale, in India, of Canadian food stuffs and other commodities received as grants was allocated to India up to March 31, 1971 and utilised for research, crop production, soil conservation, minor irrigation, animal husbandry, dairy and milk supply, fishery and forestry programmes. In addition, Canada has supplied wheat and fertilisers. Canada also provided assistance in the form of experts, equipment, spare parts and training of Indian personnel for two five-year projects, viz., (a) Dry-Land Farming Research Project and (b) Ground water Research Project in hard rock areas of Andhra Pradesh. Under the Colombo Plan, 96 fellowships were also provided by Canada during 1951—73. The Canadian International Development Agency has agreed to supply 4,500 young heifer calves to Amul Dairies (Gujarat), and to assist in establishing an integrated cattle development project in Ludhiana (Punjab). The Canadian Government has also shown interest in supplying coarse grains to Indian Dairy Corporation for use in the production of balanced cattle feed for the areas covered by the 'Operation Flood' programme. This would involve a supply of about 225,000 tonnes of coarse grains over a period of four years from 1975 to 1978.

64.2.14 Denmark: Denmark has been extending foreign assistance to India by way of loans since 1963, although it became a member of the Aid India Consortium only in 1968. Up to March,

1971 general-purpose credits and food loans given to India amounted to Rs. 13.5 crores. Economic and technical cooperation between the two countries has been mainly in the field of cattle development, dairy farming, artificial insemination, training, extension, etc. The important agreements entered into with Denmark so far pertain to Indo-Danish Project for Agricultural Development, the Dairy Development Centre at Anand, Indo-Danish Cattle Development Project at Hessarghatta (Karnataka), Foot and Mouth Disease Vaccine Centre, Bangalore, Indo-Danish Multipurpose Development Project, Upper Shillong (Meghalaya), Frozen Semen Centres at Amritsar, Gurgaon, Bangalore, Bhopal/Indore and Lucknow and the Sugarbeet Development Projects in Rajasthan and Maharashtra. The total assistance received from Denmark up to March, 1975 amounted to Danish Kr. 218.92 million. Further assistance of the order of D.Kr. 43.0 million is expected to be received during the year 1975-76 for some of the ongoing projects. Denmark has recently agreed in principle to provide support for frozen semen stations and exotic cattle breeding farms proposed to be set up in different States. The assistance will be in the form of exotic cattle, equipment for the frozen semen stations, consultants and training of Indian personnel.

64.2.15 Finland: Finland provided the services of two experts to India for exploring the possibilities of setting up forest industries in the area of river Beas and supplied logging equipment for the UNDP multilateral project relating to the establishment of four logging training centres in India.

64.2.16 France: France assisted India through supply of seeds, implements and equipment for an agricultural development project in the semiarid area of Anantapur District (Andhra Pradesh). The project was designed to experiment on dry farming technology and contribute a methodological formula for developing semiarid zones. The assistance was given for a period of three years (1970—72).

64.2.17 Federal Republic of Germany: The Indo-German collaboration in the field of agriculture began with the setting up of the Indo-German Project at Mandi (Himachal Pradesh) in 1962. It was an experiment in integrated agricultural development of a whole hill district. After some experience was gained in this Project, the collaboration was extended to similar projects in Nilgiris District (Tamil Nadu) and Kangra (Himachal Pradesh) in 1966 and Almora (Uttar Pradesh) in 1969. The assistance received under these projects included machinery and equipment as a free gift, fertilisers and other material against rupee payment and services of German experts and training given to Indian nationals in Germany.

64.2.18 German Democratic Republic (GDR): Protocols have been signed between the Governments of India and GDR for scientific and technical cooperation. The agreements provide for, among others, cooperation in the fields of veterinary sciences and veterinary services, animal husbandry, agricultural cooperatives and food industries. Indian nationals were sent to GDR for training in veterinary sciences, animal husbandry and agricultural cooperatives. Also, GDR deputed experts to India for imparting training in veterinary sciences.

64.2.19 Hungary: The agreement with the Government of Hungarian People's Republic provides for assistance for the establishment of modern slaughter houses and carcass utilisation centres, and for the training of Indian nationals in commercial trout fishing and fisheries development in rivers and lakes. Scientific and technical cooperation, through exchange of experts, technicians, scholars, etc. is envisaged in agriculture and food processing and in the exchange of information relating to various fields of agriculture. Under the agreement, a delegation was deputed to Hungary to study abattoirs, meat technology, carcass utilisation, etc. and to examine the suitability of Hungarian machinery in the context of India's requirements.

64.2.20 Japan: Four Japanese agricultural demonstration farms were set up at Arrah (Bihar), Chakuli (Orissa), Ranaghat (West Bengal) and Vyara (Gujarat) with a view to increasing productivity of small-sized farms. For each demonstration farm, the Government of Japan provided aid in the form of agricultural machinery, fertilisers, pesticides, etc. and services of Japanese technicians, one each in the fields of agronomy, soil science, fertilisers and agricultural engineering. Agricultural machinery and other material worth about Rs. 2.1 lakhs were provided for these farms. With the encouraging results obtained on these farms, another four farms were set up at Khopoli (Maharashtra), Changamanad (Kerala), Bapatla (Andhra Pradesh) and Mandya (Karnataka). These farms were required to work as nuclei under the broad framework of Government of India's scheme of "Farmer's Training and Education". Subsequently, 4 of these farms at Arrah (Bihar), Vyara (Gujarat), Mandya (Karnataka) and Khopoli (Maharashtra) were converted into agricultural extension centres with the added responsibility of training of extension workers and farmers. The Japanese Government have provided total assistance of about Rs. 56.5 lakhs for these centres up to September, 1975, including the services of 4 to 6 experts in various fields for each centre.

64.2.21 Netherlands: In November, 1958, the Netherlands Government extended assistance worth Rs. 12.5 lakhs in the form of experts, machinery and equipment for the establishment of a model production centre at Bakshi-ka-Talab, Lucknow, for imparting training in improved techniques of hide flaying, carcass utilisation, tanning and foot-wear making. It has also assisted India in setting up a water development project in Gaya District (Bihar) and gave a grant of Rs. 16.5 lakhs for cultivation of food crops in drought affected areas in Sholapur District of Maharashtra. India and Netherlands also signed an agreement in November, 1967 for cooperation in conducting post-graduate courses in Nematology for students from India and South East Asia. Some of these courses have already been conducted.

64.2.22 New Zealand: New Zealand has provided technical and capital assistance to India under the Colombo Plan for dairy development. Urban milk schemes in eleven cities have been established with grants from New Zealand. The New Zealand Dairy Board has supplied dried skim milk powder under a cash-cum-grant deal, 3,000 tonnes per scheme as gift and an equal quantity against commercial purchase at most favoured customer's price, during the years 1969-70 to 1971-72. A multipurpose dairy project at Siliguri (West Bengal) is also being established with assistance of N.Z.S. 0.20 million. New Zealand had gifted 42 bulls in 1974 and trained 87 Indian personnel in agricultural sciences under the Colombo Plan up to December, 1973. New Zealand has also agreed to assist in an operational research project on crop and livestock production in Himachal Pradesh in collaboration with the State Agricultural University at Palampur. New Zealand would assist in establishing Jersey herd of 300 cattle and in setting up a frozen semen station for providing support to the crossbreeding programme in the State. The first consignment of 180 Jersey cattle, including 5 proven bulls, was received in February, 1975 to mark the beginning of this project. New Zealand would also make available experts to India and training facilities for Indian personnel in New Zealand under this project. Further, the Government of New Zealand has offered to supply equipment, etc. for four projects consisting of:

- (i) a homogeniser for Lucknow Cooperative Milk Producers' Union, worth Rs. 85,200;
- (ii) artificial insemination equipment for Cattle Development Project, Hessarghatta, worth Rs. 9,96,000;
- (iii) dairy equipment for Kodaikanal Cooperative Milk Supply Union, worth Rs. 15,76,000; and

- (iv) 2,000 frozen semen straws for Indian Dairy Corporation, worth Rs. 53,000.

64.2.23 Norway: An Indo-Norwegian project on fisheries was started in 1952 under an agreement signed by the United Nations, the Government of India and the Government of Norway. The Norwegian assistance received by India under the agreement amounted to N.Kr 89.70 million. It consisted of equipment, technical personnel, fellowships and administrative expenditure incurred by the Government of Norway. Further the Government of Norway agreed to provide technical assistance worth N.Kr 49.5 million for fisheries development during 1973—77 and to supply fertilisers worth N.Kr 60.0 million during 1973—76. An agreement made with Norway in November, 1975 provides for material and technical assistance valued at N.Kr 34.0 million for boat building programme in India during 1975—79.

64.2.24 Romania: A protocol has been signed with the Socialist Republic of Romania in 1975. It provides for technical and scientific cooperation in the fields of agriculture, food industry and water management. The exchange of information, material and seed samples is also envisaged.

64.2.25 Sweden: Sweden made a gift of 14 thousand tonnes of fertiliser to India in 1966-67 and a further gift of 38 thousand tonnes in 1972-73 and 1973-74. Sweden further assisted in the establishment of 4 logging training centres and in the conduct of a pre-investment survey of forest resources under the UNDP (SF) programme. For the logging training centres, Sweden contributed towards the cost of equipment and the conduct of studies of plants. In the case of pre-investment survey of forest resources, the Swedish International Development Authority (SIDA) financed the training of 8 inventory crew leaders at the Swedish National Forest Resources Survey. Sweden has also assisted in the conduct of a pre-investment survey of fishery harbours in India under the UNDP(SF) programme. The survey is continuing. In 1975, SIDA deputed 5 experts for feasibility studies in the field of forest development, 4 for groundwater projects and 1 for fisheries project.

64.2.26 Switzerland: On July 12, 1963 an agreement was signed by India and Switzerland to establish a Joint Collaboration Project for Cattle, Fodder and Dairy Development at Munnar, Kerala. Breeding programme was started in 1963 with 22 Brown Swiss bulls and 45 cows imported from Switzerland. A frozen semen station was set up in 1965. This was the first station in India to produce liquid nitrogen in its own laboratory for use in frozen semen technique. The

collaboration was extended by three further agreements made in 1966, 1968 and 1970. The last agreement was valid until March, 1974. The Swiss Government have committed Sw. Fr. 13.50 million for this project. Another agreement was signed on June 17, 1971 for technical cooperation in the establishment of Indo-Swiss Cattle Development Project at Patiala (Punjab). By further agreement, both the projects have been continued during the Fifth Five Year Plan for which a contribution will be made by the Swiss Government. An agreement has also been concluded in February, 1975 between the Government of India and the Government of Switzerland for the establishment of Indo-Swiss Cattle Development Project at Visakhapatnam, Andhra Pradesh. The Swiss contribution will be S.Fr. 9,50,000 and the counterpart contribution of the Government of India will be Rs. 50 lakhs. The project will be on the lines of those already under implementation in Kerala and Punjab.

64.2.27 United Kingdom (UK): Under the Colombo Plan, the United Kingdom granted 318 fellowships to Indian nationals for training in different branches of agricultural science during 1951—73. In addition to this, she provided assistance of the value of £ 3,408 in 1964 for the purchase of freezing equipment for the National Dairy Research Institute, Karnal (Haryana). British experts have visited India to examine the feasibility of collaboration in different fields like dryland farming, cotton research, Operation Flood programme, groundwater exploration, grassland and fodder development, etc.

64.2.28 United States of America (USA): The US assistance has been extended to India through the Technical Cooperation Mission, the Development Loan Fund and its successor, the Agency for International Development (AID), the Export Import Bank, the Public Law 480 programme and similar other agencies. Some of the important programmes for which US assistance was received were:

- (i) All India Coordinated Rice Improvement Project.
- (ii) Establishment of 3 large fertiliser factories at Visakhapatnam, Trombay and Madras.
- (iii) Agricultural education, extension and research.
- (iv) Agricultural production and modern storage of foodgrains.
- (v) Animal husbandry, dairy development, etc.

The assistance received from the USA has been in the form of outright grants, long term loans, services of experts and technicians and the training of Indian nationals in the USA. An agreement was signed between the Government of India and the Government of USA in December, 1973 providing for the disposal of USA owned rupees

generated by PL 480 grain sales and other economic assistance to India in the past 20 years. The terms of the agreement provide for the Government of the United States to grant to the Government of India Rs. 1,664 crores, roughly two-thirds of India's debt to the United States, to be used to help finance various development projects included in India's Fifth Five Year Plan. Out of this amount, Rs. 1,000 crores are expected to be spent on the development of agriculture including agricultural research and education, minor irrigation, animal husbandry and dairy projects, special projects of rural development and employment, soil conservation and land development.

64.2.29 Union of Soviet Socialist Republics (USSR): In the field of agriculture, Russian assistance started with the setting up of Central State Farm at Suratgarh (Rajasthan) in 1956. Another Central State Farm with their assistance was set up in 1964. Assistance was received in the form of machinery as free gift. In November 1966, another agreement was made between the two Governments for setting up five state agricultural seed farms in the States of Orissa, Haryana, Punjab, Karnataka and Kerala. Agreement was also made in 1971 for scientific and technical cooperation in the field of agricultural and animal sciences. It laid emphasis on cooperation between scientific institutions, exchange of visits of agricultural scientists of the two countries, and joint research in the field of agriculture and allied sectors. The protocol signed in 1974 envisages, among others, cooperation in sheep and wool development, research in genetics, milk production and processing technology and development of forage crops and grasses suitable for temperate, tropical and sub-tropical areas. In 1975, 10 scientists were deputed to the USSR in the field of animal husbandry and 5 scientists to participate in wheat symposium. A delegation of Soviet scientists visited India to study the experience gained in high yielding fodder crops in temperate and arid conditions and the work of agricultural universities as well as for working out the plan of operation of joint projects on rice diseases. Further, the USSR has supplied 250 Karakul sheep for the Central Sheep and Wool Development Institute, Avikanagar (Rajasthan) for research.

64.2.30 In addition to the assistance received under the bilateral agreements mentioned above, the agreements with various countries on cultural exchange programmes have provided scope to depute Indian nationals to different countries for training and study in a number of fields. For example, Indian experts were deputed to study goat breeding in Mongolia, sunflower, plant breeding techniques with special reference to chilli and fennel and virological works in Hungary

and biology and pathology of breed and non-contagious diseases in Bulgaria.

Non-Official Agencies

64.2.31 India has been receiving assistance from some non-official agencies such as the People's Action for Development, Ford Foundation, Rockefeller Foundation, etc. These agencies have given sizable assistance to India in different branches of agriculture to improve her production potential.

64.2.32 People's Action for Development (India): Formerly known as Freedom From Hunger Campaign, the People's Action for Development was launched in India by the FAO in July, 1960 with the object of freeing people from hunger and malnutrition with the help of the people and voluntary contributions. The activities of this agency relate to (a) dissemination of information on nutrition and production through various information media, (b) initiation of action projects mainly through non-Governmental agencies, (c) involvement of youth in food production activities, and (d) setting up of an Input Bank to enable participating organisations within the country to help each other. Since its inception, 150 projects involving an expenditure of Rs. 470.55 lakhs have been implemented and 79 projects costing Rs. 1,117.08 lakhs are at various stages of implementation. Proposals for 12 new projects, estimated to cost Rs. 155.43 lakhs, have been referred to the FAO and other donors for consideration and adoption.

64.2.33 Ford Foundation: The Ford Foundation has been assisting India since 1951 and its total assistance till March, 1973 has been of the order of \$ 100.54 million. This includes \$ 29.86 million as aid for agricultural and rural development. It has provided assistance to Indian agriculture mainly through Intensive Agriculture District Programme (IADP) and a number of other *ad hoc* projects. The total support of the Foundation to the IADP programme since 1960-61 amounted to \$ 14 million. The major components of the assistance for this programme have been the provision of services of specialists and consultants, training of project personnel, research and surveys and scientific demonstrations. Some of the important programmes/projects assisted by the Ford Foundation in the field of agricultural and rural development relate to agricultural extension, centres for the training of village level workers, in-service training programme for rural development, rural housing, community development projects, village industries, etc. Among the other major pro-

grammes assisted by the Ford Foundation are the establishment of Water Technology Centre at the IARI, New Delhi and the Pilot Research Project on Growth Centres sponsored by the Department of Rural Development.

64.2.34 Rockefeller Foundation: The total assistance from the Rockefeller Foundation amounted to \$21.5 million upto March, 1973. Of this amount \$10.23 million were provided for agriculture. The bulk of its assistance under agriculture has been given for the programme of setting up of post-graduate training facilities at the Indian Agricultural Research Institute (IARI), New Delhi, and for research on improvement of cereals with particular emphasis on hybrid maize, sorghum and millets. The Foundation also assisted in the development of a national seed industry and the development and management of experimental stations and farms. The assistance has been provided in the following forms:

- (i) assignment of specialists for the organisation of post-graduate agricultural education and the cereal improvement programme;
- (ii) training in USA of Indian scientists associated with the post-graduate education and the cereal improvement work;
- (iii) funds for special requirements of the projects, which cannot be readily met from local sources *e.g.* special items of equipment, laboratory and field instruments and other necessary apparatus; and
- (iv) travel grants to visiting scientists to attend important seminars, symposia, etc. in the USA.

Programme-wise Analysis

64.2.35 An analysis of the foreign assistance received by India in specific fields of agricultural development is given below.

64.2.36 Crop production: A major contribution to the development of strategy for agricultural production has been made by the Intensive Agricultural District Programme (Package Programme), which was started in 1960-61 with a substantial assistance from the Ford Foundation. Some of the other important programmes and projects which have helped modernise crop production in India were all-India coordinated rice improvement project assisted by the USA; introduction of dry farming techniques through an agricultural development project in the semi-arid areas of Anantpur District Andhra Pradesh assisted by France; setting up of Central State Farms at Suratgarh and Jetsar (Rajasthan) and five State agricultural seed

farms in Orissa, Haryana, Punjab, Karnataka and Kerala assisted by the USSR; Tarai seed development project (Uttar Pradesh) assisted by the World Bank; farmers' training and functional literacy programme assisted by the FAO; Indo-Japanese agricultural extension centres set up in Bihar, Gujarat, Maharashtra and Karnataka; and the Indo-German agricultural development projects established in Mandi and Kangra Districts, Himachal Pradesh, Nilgiris District, Tamil Nadu and Almora District, Uttar Pradesh.

64.2.37 Fertilisers and Pesticides: The use of fertilisers and pesticides is an integral part of the package of practices recommended for increasing agricultural production. While most of the programmes and projects sponsored for the introduction of scientific methods of crop cultivation and supported by foreign aid included assistance for the propagation and adoption of fertilisers and pesticides, there were also cases where foreign assistance was given exclusively for these items. Special mention may be made of the desert locust project sponsored in 1960 with an assistance from the UNDP, agricultural aviation project launched in 1971 with the assistance of the World Bank; fertiliser use programme and the establishment of three large fertiliser factories at Trombay, Madras and Visakhapatnam, assisted by the USA; free supply of about 52,000 tonnes of fertilisers by Sweden from 1966-67 to September, 1974; supply of 49,200 tonnes of fertiliser by Norway in 1973 and 1974; and the Indo-Russian joint research in virus and microplasma diseases of rice.

64.2.38 Irrigation: The World Bank aid was given to India both for minor irrigation projects and some of the major irrigation projects. Ten minor irrigation projects located in Gujarat, Punjab, Andhra Pradesh, Tamil Nadu, Haryana, Karnataka, Madhya Pradesh, Uttar Pradesh, Bihar and Maharashtra have received aid from the World Bank Group. The major projects which were assisted by the Bank Group were the Rajasthan Canal Project, the Chambal Canal Project, the Mahi-Kadana Project and the Pochampad Project. The other important irrigation programmes which were supported by foreign aid were groundwater surveys in Rajasthan and Gujarat and pilot projects in soil and water management in the Chambal area (UNDP); groundwater exploration in hardrock areas of Andhra Pradesh (Canada); groundwater exploration in parts of Bihar (Netherlands); and soil and water management projects in Gujarat, Karnataka, Madhya Pradesh, Punjab and Uttar Pradesh (USA).

64.2.39 Animal husbandry and dairy development: Considerable assistance has been received from several foreign countries under bilateral agreements as well as from international bodies such as the

UNDP, UNICEF, WHO, FAO, Colombo Plan, WFP, World Bank etc. for programmes to improve animal production and to make better utilisation of animal products like milk, meat, carcasses, eggs, wool. A number of non-official voluntary organisations like the Oxfam (UK), Heifer Project Inc. (USA), "Society for Those who Have Less" (Australia) have also extended considerable help in livestock development activities.

64.2.40 The projects for which aid has been received included the establishment and strengthening of research laboratories, educational institutes, biological production centres, livestock breeding farms, dairies, bacon factories, carcass utilisation centres, slaughter houses, wool grading centres, egg grading and marketing units, etc. Further, under the aid programmes, the Indian scientists, technicians, and teachers received training abroad in various disciplines, and foreign experts came to India to share their know-how with their Indian counterparts. Particular mention may be made of the massive assistance received from the WFP for the Operation Flood programme and from the World Bank for dairy development work. Several countries like New Zealand, Sweden, USA, Australia, Denmark have given considerable aid in various forms to build up the animal industry. Rural creameries have been set up with Yugoslav assistance. The Danish Government is also extending considerable financial and technical assistance for the setting up of Foot and Mouth Disease vaccine Production Centres. The prompt and timely help received from the FAO made it possible to eradicate African horse sickness within a short time. As a result of foreign assistance, some improvements in the productivity of indigenous cattle, sheep and pigs have been brought about and poultry industry has been established on a sound footing.

64.2.41 Fisheries: The fisheries development programme has received foreign aid from the FAO, UNDP, Norway, Sweden and the USA. The FAO/UNDP provided experts in fishing techniques, particularly trawling, and expertise in boat-building. They also assisted in conducting a pre-investment survey of fishery harbours in India and in establishing a fisheries training institute at Bombay. Investigations on pelagic fisheries on the south-west coast of India were carried out with the assistance of the UNDP. Norway provided assistance for the purchase of equipment for fishing stations and for the boat-building programme, and for setting up an Indo-Norwegian Project for deep sea fishing and fisheries development. Sweden made a gift of two research-cum-training fishing trawlers. The expansion and modernisation of marine and inland fisheries was another im-

portant programme undertaken by India with foreign assistance. Aid for this programme was provided by the USA.

64.2.42 Forestry: The main programmes for which foreign assistance was received were the establishment of four logging training centres, exploration of the possibilities of setting up forest industries in the area of river Beas and the conduct of a pre-investment survey of forest resources. The setting up of the logging training centres and the conduct of the pre-investment survey were multilateral projects under the UNDP Special Fund Programme. For these, Sweden provided a total assistance of Sw. Cr. 4.75 million. Finland supplied logging equipment for the establishment of logging centres and provided the services of experts for the exploration of the possibilities of establishing forest industries.

64.2.43 Research, Education and Training: In this field a sizable amount of foreign assistance has been received both under the multilateral and the bilateral arrangements. The assistance received has been mainly in the form of technical experts, equipment necessary for the use of the technical experts, fellowships for the training of Indian scientists abroad and financial aid for the development of infrastructure facilities for research, education and training. Agencywise and programmewise assistance received in the assignment of agricultural experts to India and fellowship granted to Indian personnel for training abroad during 1951—73 are given in Appendices 64.1 and 64.2 respectively. The main programmes for which foreign assistance was received were the establishment of facilities for nuclear research in agriculture for increased and intensified food production and livestock improvement at the Indian Agricultural Research Institute, New Delhi, the Bhabha Atomic Research Centre, Bombay, the Indian Veterinary Research Institute, Izatnagar and the National Institute, Karnal (UNDP), strengthening of training facilities at institutions like the Sheep and Wool Development Institute, Malpura, the Central Plant Protection Training Institute, Hyderabad and the Central Institute of Fisheries Education, Bombay (FAO/UNDP); higher education and training in food and nutrition at agricultural universities and colleges and provision of stipends for training in applied nutrition programme (UNICEF); agricultural education project at agricultural universities in Assam, Bihar and Delhi (World Bank); dry-land farming research project at a number of centres representing different soil and climatic conditions (Canada); conduct of post-graduate courses in Nematology (Netherlands); supply of atomic spectrophotometers for use in the micro-nutrient research projects at various research institutes under the Indian Council of

Agricultural Research (Australia); research in genetic improvement of cattle and buffaloes and research in milk production, processing and technology of milk products (USSR); training in agricultural machinery utilization, Agricultural University Development Project and the grant of a large number of fellowships to Indian personnel for training abroad (USA).

64.2.44 Some of the non-official agencies have also given substantial assistance to India for conducting research and training in agriculture and allied sectors. Special mention may be made of the programmes of setting up of postgraduate training at the Indian Agricultural Research Institute, New Delhi and of research on improvement of cereals, assisted by the Rockefeller Foundation; development of an integrated programme of research in plant protection at the University of Agricultural Sciences, Bangalore, establishment of water technology centre at the IARI, New Delhi and the strengthening of the Department of Teaching and Research at the College of Agricultural Engineering, Ludhiana and the Soil Conservation Research Demonstration and Training Centre, Dehra Dun, assisted by the Ford Foundation.

Assistance Rendered by India

64.2.45 Indian assistance to other developing countries in Asia and Africa in the field of agriculture has been rendered largely under two programmes—the Indian Technical and Economic Cooperation Programme (ITEC) and the Colombo Plan. Deputation of Indian experts to those countries and training facilities offered to their nationals in India constitute the main components of the programme. In addition, technical experts and fellowships in various disciplines are provided to the developing African countries under the Special Commonwealth African Assistance Plan (SCAAP). Under the Colombo Plan assistance was given to Nepal, Bhutan and Sri Lanka for some development projects. This assistance is gradually increasing from year to year. A brief resume of some of the more important projects for which assistance has been given by India in the sphere of agriculture during the last five years is given below.

ITEC Programme

64.2.46 In the field of agriculture, deputation of Indian experts has been the largest single item of assistance under the ITEC Programme. A large number of individual experts were deputed to and

eight agricultural experts' teams or delegations visited several developing countries in the last five years for the purpose of advising and assisting them in land development, crop cultivation, research, storage, marketing, etc. A group of 8 agricultural experts was assigned to Afghanistan in 1970-71 for assisting that country in its agricultural research programme. Indian experts were sent to Fiji in 1970-71, Guinea and Senegal in 1971-72, Zaire in 1973-74, and to Ethiopia, Yemen, Fiji and Zanzibar in 1974-75. The largest number was deputed to Iraq in 1974-75. Of the eight teams or delegations of agricultural experts, six visited the countries of West Asia, one of North Africa and one of South-East Asia.

64.2.47 A large number of nationals of these developing countries, scholars and experts, received training in India in various disciplines connected directly or indirectly with crop production. The largest group of trainees came from Fiji in 1970-71. (Others were given training in sago cultivation, sugar technology and general agriculture in subsequent years. India has agreed to provide training facilities in India to Afghan nationals in various agricultural fields. Training facilities have been arranged for four nominees of Tanzania at the National Sugar Technological Institute, Kanpur (Uttar Pradesh).

64.2.48 Crop production: Among the technical and other assistance rendered by India for crop production, mention may be made of the preparation of feasibility reports for agricultural projects in irrigated areas with problems of salinity, the development of modern seed farms and seeds certification set-up and the drawing up of projects on the lines of IADP in India—all in Iraq. The teams of experts, which visited Iraq for this purpose, also rendered advice on cooperative and banking credit structure for agriculture in Iraq. An Indian team visited Oman to explore the feasibility of establishing a mechanised farm. India has agreed to assist in the setting up of an agricultural institute in Afghanistan. At the request of the Government of Guinea, 10,000 casava stems were airlifted to that country in 1975. Besides these, India supplied ginger rhizomes to Fiji and mango sapplings and seeds to the People's Democratic Republic of Yemen in 1974-75. An agreement has been made between India and Ghana for the exchange of cashewnut seeds for equal quantity of cocoa seeds. Seeds of different varieties are being supplied to the Maldives as gift. Steps are also being taken to supply seeds of different types to the hill tribes in Thailand. India has agreed to exchange scientists

with Iran in different disciplines for development of wheat production in both the countries.

64.2.49 In the field of fertilisers and pesticides the main items of Indian assistance comprised the deputation of an entomologist to Muscat in 1972-73 and some experts to Iraq in 1974-75 and the supply of insecticides to Afghanistan in 1973-74. India is supplying equipment to Afghanistan for setting up a museum of pests and plant diseases. Officials from Thailand were given training in gobar gas at various centres/institutes in India.

64.2.50 Supply of agricultural equipment and machinery, generally as a free gift, was another important item of assistance given by India. The major beneficiary in this respect has been Afghanistan which has been receiving almost every year since 1969-70 a substantial amount of agricultural machinery and equipment. India also made a gift of soil-testing laboratory equipment and agricultural implements to Cambodia and of agricultural machinery for intensive development of a selected district in Indonesia in 1969-70. India has gifted two wheat threshers to Yemen and has committed to supply a few other agricultural implements to that country during 1975-76. Steps are also being taken to supply ten gobar gas units to Sri Lanka.

64.2.51 Irrigation: India has been providing assistance to other developing countries for the development of irrigation. Financial aid and supply of equipment have been the main forms of assistance rendered for this programme. The assistance has been given mainly for two projects—the Chardeh Ghorbund Micro-Hydel Project and the Khawaja Ali Dam in Afghanistan. Irrigation pump sets worth several lakhs of rupees were also supplied to Afghanistan in 1973-74. Burma has also been given a sizable amount of aid for the Chindwin River Valley Project. Besides these two countries, a number of other countries have received assistance from India for irrigation. India supplied pumping sets as gift to Yemen Arab Republic in 1971-72 and 1974-75, Senegal in 1974-75 and to Gabon in 1975-76. Mauritius received aid for its West Coast Irrigation Project in 1971-72.

64.2.52 India conducted a feasibility study of Mak Nao Irrigation Project in Laos in 1971-72. Teams of experts were deputed to conduct a study of underground water resources in Qatar in 1973-74. Irrigation experts were also sent to Afghanistan in 1970-71 and to Algeria and Iraq in 1974-75. Two experts in the construction of masonry dams were deputed to Afghanistan in 1973-74. Some irrigation engineers were deputed to Kenya in 1974-75 and the deputation of some more to the same country was under consideration in 1975-76. Training facilities were offered to the nominees of the Iraq

Government at the Water Resources Training Centre, Roorkee in 1971-72 and 1972-73. An expert team visited Iraq to advise on soil reclamation and water management.

64.2.53 Animal husbandry: In the field of animal husbandry, a sum of Rs. 20.30 lakhs was allocated for the Animal Husbandry Project in Sri Lanka in 1974-75 and a provision has been made for a further aid of Rs. 34.00 lakhs for the same project in the current year. Out of the total allocation, sanction has already been accorded for an expenditure of Rs. 31.43 lakhs for the supply of cattle, rams and ewes, and equipment and machinery. Other items of assistance have been the deputation of animal husbandry experts to Sri Lanka in 1973-74 and the supply of goats to People's Democratic Republic of Yemen in 1974-75. Supply of buffaloes and equipment for artificial insemination to some other friendly countries is also being undertaken during 1975-76. India has agreed to assist Afghanistan in establishing a dairy farm at Kabul. Indian experts were accordingly deputed to advise the Government of Afghanistan. The agreement between India and Iraq provides for training in India of Iraqi officials and students in animal breeding and veterinary services.

64.2.54 Fisheries: A memorandum of understanding for the development of fisheries in Iran provides for the supply to ten mechanised wooden boats to that country for testing their suitability for fishing in Iranian waters and for enabling the Iranian fishermen to get acquainted and trained in the handling of these boats. Under this memorandum, India has agreed to collaborate with Iran in joint investment in boat building, repair workshop and net weaving factories in Iran, in undertaking a survey of off-shore and deep sea waters of Persian Gulf area and projects for the establishment of libraries, aquarium and museum in Iran. Training facilities will be made available to Iranian nationals in different fishery institutes in India. Agreement has also been made with Iraq for training in India of Iraqi officials and students in fisheries. Indian experts have prepared a project report for fishery development in Oman. India has also gifted fish seedlings to Mauritius and deputed an expert on fisheries to that country. Experts are also to be provided to Afghanistan for fisheries development there.

64.2.55 Forestry: India's assistance in the field of forestry has been confined to the provision of training facilities to foreign nationals. Five trainees from Laos and one from Sudan were admitted for training at the Forest Research Institutes in India since 1973-74. There were short visits of four forestry officials of Laos in 1973-74 and of two in 1974-75 for acquainting themselves with the

forestry development work and the administration of forests in India. Arrangements have been finalised to provide training in saw milling to one of the nominees of Sierra Leone at the Forest Research Institute, Dehra Dun.

64.2.56 Agro-Industries: India provided assistance to Afghanistan in 1973-74 for the establishment of a mini rice mill and equipment for the same project in 1974-75. A team of Indian experts visited Maldives in June, 1974 and prepared a detailed project report for setting up a fish canning plant. A request from the Maldives for further assistance from India for setting up the plant is under consideration. A feasibility study on setting up a fertiliser plant in Bangladesh was conducted by Indian experts in 1974-75. A team of Indian experts conducted a techno-economic survey in Sudan in 1974-75 for setting up sugar industry in that country.

The Colombo Plan

64.2.57 India has provided both financial aid and technical assistance under the Colombo Plan. It has advanced financial aid to Nepal, Bhutan, Sri Lanka and Indonesia and technical assistance to almost all countries in the South and South-East Asian region.

64.2.58 Large financial assistance has been given to Nepal for the horticultural programme. Some of the items for which this assistance was utilised were construction of glass houses and water tanks at horticulture stations, visit of a team of Citrus experts and conducting potato varietal trials in the Nepal Tarai area. Survey equipment was supplied to Burma for the purpose of being utilised for the training of 1200 persons in survey work. For the Soil Mechanics and Concrete Testing Laboratory in Khmer Republic India had supplied equipment and spare parts. During the last 5 years, i.e. 1969-70 to 1973-74, India had deputed 11 experts in the field of agriculture to other Colombo Plan countries and provided training to 285 of their nationals in the same field.

64.2.59 Both financial and technical assistance was given to Nepal for some of their irrigation schemes. Chatra canal and 15 minor irrigation projects have received the bulk of the aid. The other projects were Trisuli Hydel Project, desilting of Trisuli Tank, repairs to Phewatlal Dam and some small irrigation schemes. India was associated with preliminary planning studies of the Mekong Basin in Khmer Republic, conducted by the ESCAP, and contributed scientific equipment for the hydrological network of the project. India provided the services of an expert to help establish a flood forecasting service in the Lower Mekong Basin. It also sup-

plied equipment to Khmer Republic for the construction of diversion weirs on Prek Thnot Project and provided technical assistance for Tonle Sap Project.

64.2.60 In the field of animal husbandry India provided assistance to Nepal for establishing a central veterinary laboratory in Kathmandu, 33 veterinary hospitals in different parts of the country, cattle breeding centres, and running of rinderpest eradication schemes. In addition, assistance was rendered in diagnosing various pathological diseases and obtaining vaccines for their control. India had also provided the services of experts in dairy development to some of the Colombo Plan countries within the region.

64.2.61 In the field of forestry, India rendered sizable assistance to Nepal for forestry development work and provided training facilities to the nominees of other member countries of the region.

64.2.62 In addition to the programmes mentioned above, India provided financial and technical assistance to Nepal for community development projects and rural development programmes in which agriculture and agriculture-based activities figured prominently. To Bhutan, India has been providing liberal financial assistance for the implementation of its successive-five year plans which again inevitably have had agriculture and allied programmes as an integral part thereof.

3 SCOPE AND PROSPECTS OF FURTHER ASSISTANCE IN AGRICULTURE

64.3.1 The question of future foreign assistance in the field of agriculture is closely linked with the objective of achieving self-reliance, resulting in net zero aid, as outlined in the Third and subsequent Five Year Plans. In the Third Plan, it has been stated "The balance of payments difficulties the country is facing are not short-term or temporary; they will continue for several years to come. The external assistance is essential for this period, but the aim must be to make the economy more and more self-reliant, so that it is able to support within a period of 10 to 12 years an adequate scale of investment from its own production and savings. Normal inflow of capital may continue but reliance on special forms of external assistance has to be reduced progressively and eliminated." The three essential elements of this objective were:

- (i) elimination of special forms of external assistance;
- (ii) phasing of self-reliance efforts; and
- (iii) external assistance during the intervening period should help to build up the growth potential of the economy to

the level where it can support an adequate level of investment from its own resources.

64.3.2 The Fourth Five Year Plan made an advance on the earlier objective by laying down a time-schedule for realising the goal. The objective was stated as "reducing foreign aid, net of debt servicing (inclusive of interest payment) to half of the current level by the end of the Fourth Plan and to eliminate it altogether as speedily as possible thereafter." It was further stated in the Plan document that the country would dispense with gross concessional aid by 1980-81 except to match debt repayments.

64.3.3 The draft Fifth Five Year Plan re-emphasized the objective of self-reliance. Some of the measures necessary for achieving self-reliance, which fall within the purview of the agricultural sector, are export promotion and import substitution, which we have discussed in Chapter 12 on Export Possibilities and Import Substitution, development of capacity for a greater indigenous production of fertilisers, increased food production and better management of the food economy. To the extent the success of these measures depends upon the import of certain essential raw materials, machinery, technical know-how and even direct financial aid, foreign assistance has to be availed of for the purpose.

64.3.4 In the next phase of India's development, the prospects of foreign assistance in agriculture have, therefore, to be explored mainly in the fields of advanced production technology, import of essential raw materials and capital goods, of which there is either absolute shortage in the country or which have not yet been developed to the extent of being put directly in the production line, development of specific areas and means of production which are still undeveloped or underdeveloped but have the potential for development which will lead to increased production, infrastructure facilities, research and training. The fields are, no doubt, vast and varied but are purposively interlinked to a single goal, that is building up of indigenous capacity for increased production, ultimately leading to self-sufficiency in foodgrains and other agricultural products. Once this capacity is built up and self-sufficiency achieved, there will be a big saving in foreign exchange requirements and the dependence on foreign assistance will be eliminated to a large extent.

64.3.5 The foreign assistance needed until then will comprise financial aid, raw materials, and equipment and technical assistance. The scope and prospects of assistance in the various fields of agriculture are discussed below.

64.3.6 Crop production: The spectacular success of the high yielding dwarf varieties of wheat developed in Mexico and rice

varieties bred in Taiwan and Philippines has brought the importance of imported seeds for higher productivity into prominence. There is still a great scope for testing of promising varieties of foodgrains and other crops evolved in other countries and introducing them or adopting them to suit local needs. A very large range of plant material is now available to the modern plant-breeder and it is necessary that the Indian breeder also keeps himself abreast of the latest developments. For this purpose, international and inter-regional cooperation in plant breeding through multidisciplinary research in specific crops and seed exchange programmes will be required.

64.3.7 Advances in genetics have made it possible to evolve plant varieties to suit Indian requirements. We are, however, still in the initial phase of genetical engineering and artificial transmutation of genes. Work done in this field in India in the various crops during the later part of the sixties has shown that there are possibilities of further improvement in all the crops. With greater recognition of interchange of plant material all over the world, the modern plant breeder has a much greater range of material available to him for his researches than ever in the past. It is time that India also participates in a big way in such work, keeping in view the larger requirements of the economy. Fortunately, this cooperation need not be in one direction only. Indian scientists also could contribute significantly to advances in crop research. Need for technical assistance may still be there in specific fields by way of experts from other countries working in India and facilities for training of Indian scientists abroad. Foreign aid may also be necessary for the purchase of sophisticated laboratory, seed testing and cleaning storage and disinfestation equipment which is not available locally.

64.3.8 There is at present general recognition of increasing production by an integrated application of inputs supported by suitable cultural practices. International cooperation, such as Indo-German and Indo-Japanese projects and the IADP, has contributed to generate this new approach in India. There is, however, considerable scope for further international cooperation in the following fields:

- (i) regional planning for agricultural production in clearly defined agro-climatic zones;
- (ii) intensification of commodity approach in crop production, particularly in commercial crops like oilseeds and fibres; and
- (iii) soil analysis and micro-nutrient research.

64.3.9 Fertilisers and pesticides: India has been receiving foreign assistance for the import of fertilisers and pesticides (technical

grades), raw materials, plant and machinery required for the manufacture of these inputs, and technical assistance. India is, however, still not self-sufficient in most of these items. There is need for further foreign assistance in the following fields:

- (i) import of fertilisers and pesticides (technical grades) not locally manufactured;
- (ii) import of raw material and equipment for the manufacture of fertilisers and pesticides;
- (iii) research on the most effective and/or economical use of material and formulations; and
- (iv) forecasting and control of pests and plant diseases.

64.3.10 Animal husbandry and dairy developpment: This sector has received considerable foreign assistance both under the multi-lateral and the bilateral aid programmes. It would be useful to have further foreign collaboration to build up animal industry on scientific lines. The areas where foreign collaboration is needed are briefly listed below:

- (i) setting up of plants to manufacture foot-and-mouth disease vaccine;
- (ii) frozen semen from quality bulls;
- (iii) supply of high-producing milch animals and equipment for the establishment of frozen semen stations;
- (iv) supply of fine wool and mutton breeds of sheep;
- (v) supply of high quality foundation breeding stock of pigs; and
- (vi) supply of pure live poultry-breeding stock.

64.3.11 Fisheries: Through external assistance India has developed facilities for mechanised marine fishing and exploratory surveys. With these achievements, priorities have shifted to specific sectors of development and towards greater sophistication in fishing methods and aquacultural techniques. There is still need for development of purseining and other methods of pelagic fishing. Technological advice and assistance are required for mid-water trawling and tuna fishing.

64.3.12 Forestry: Our Interim Report on Production Forestry—Man-made Forests has pointed out the need to increase significantly the production of coniferous raw materials for the pulp and paper industry, which cannot be sustained on the available sources of bamboo. Since bamboo alone cannot provide the range of fibres required for this industry, part of the future long fibre needs would have to be met both from the existing coniferous forests' as also by establishing tropical pine plantations for meeting the requirements of

the industry. The experience in India is limited in this regard, and so bilateral or multilateral assistance for supply of seeds and trial of tropical pine species will be required. In the search of new sources of raw materials for the pulp and paper industry, eucalyptus, as a fast growing hardwood, is mostly being depended on. The species is mainly the 'Mysore Hybrid', but it is important that efforts should be made to introduce provenances or species adapted to particular site conditions. Assistance from countries having greater experience of management of eucalyptus would have to be secured.

64.3.13 On the industrial side, it would be necessary to develop improved technology, if necessary with multilateral or bilateral assistance. The main concern would be not only to find the suitability of a larger number of hardwoods for pulping but also to develop the technology of simultaneous use of larger number of hardwood species in mixture for pulp industries.

64.3.14 For increasing the forest productivity, it would be necessary to extend research on seed improvement and tree breeding in a big way. There are some countries, which have acquired sufficient experience in these fields on tropical species under tropical conditions. For exchanging the research experience and for extending the research base in these fields, assistance from such countries would have to be arranged in addition to bilateral assistance in the nature of fellowships and training facilities.

64.3.15 Development of wildlife is another field where advantage could be taken of the expertise available with international agencies, like the FAO, World Wildlife Fund, the International Union for the Conservation of Nature, etc.

Sophisticated Technical and Processes

64.3.16 Modern techniques of aerial photography and mapping, often used with the help of foreign consultants, have done much to speed up compilation of data on land use but further ground reconnaissance and soil surveys by skilled technicians are needed. Further, greater use of latest developments in remotesensing and infra-red photography will have to be made for detecting plant diseases and assessing soil characteristics. This programme needs import of sophisticated equipment and foreign expertise for guiding and training local staff. The latest developments in electronics, sound engineering and the use of invisible rays have been applied to agriculture. The new equipment, such as driverless tractors, photo-sensitive aeroplanes, aerial seed drills and drip irrigation, have been developed

in the foreign countries. There will be scope, in future, for the use of these equipment and processes in India also.

Technical Assistance

64.3.17 India has made a good use of foreign assistance and expertise in developing her own research and expertise with the result that the scope for classical forms of technical assistance, specially the foreign experts in the basic fields, has considerably diminished and will have a still lesser relevance in the coming years. Nevertheless, the services of foreign experts will be needed for efficacious consultancy in the various fields, particularly for the transmission of advanced technical knowledge and development of indigenous expertise, therein. The foreign experts in future will, however, be needed more as consultants than as regular, whole-time advisers and our future need for foreign expertise will be mostly in the fields of advanced production technology, research and training.

64.3.18 Besides availing of the services of foreign consultants for developing our expertise in more advanced and sophisticated technology, it will be useful to continue the scheme of fellowships for the training of Indian scientists in the foreign countries where the new techniques have been evolved. This will help quicken the pace of both the development of Indian agriculture and the building up of India's own capability.

Prospects of Indian Assistance

64.3.19 In the spirit of international cooperation, economic and technical assistance would be made available to other developing countries of Asia and Africa under the various programmes. In the field of crop production, as referred to in Chapter 47 on Seeds, it should be part of the policy that the country should also be in a position to provide seed to other countries. In respect of fertilisers and pesticides, India can provide experts and training facilities to other countries.

64.3.20 In the field of irrigation, the country is in a position to provide assistance in conducting feasibility studies and preparation of project reports, provide consultants and depute irrigation engineers and offer fellowships for training in India. It can undertake turn-key jobs of constructing irrigation projects. It can also supply pumping sets and other equipment used for irrigation schemes.

64.3.21 In respect of animal husbandry India is now in a posi-

tion to give aid in the following fields to other developing countries:

- (i) establishment of biological production stations for manufacture of several vaccines and diagnostic agents;
- (ii) establishment of disease investigation laboratories;
- (iii) setting up of animal science teaching and research institutions;
- (iv) supply of dairy and poultry equipment;
- (v) installation of dairy plants and feed mixing plants on turnkey basis; and
- (vi) setting up of livestock farms.

64.3.22 In the field of fisheries, India has the scope of long-distance deep sea fishing. As the largest fishing nation in the Indian Ocean area, India should keep up good international cooperation in marine fisheries and undertake cooperative research and investigations with the neighbouring countries in subjects of common interest. Research institutions in marine fisheries and oceanography should also be fully equipped to handle this task.

64.3.23 With regard to forestry, India is in a position to continue to provide facilities for forest education and training to students from other countries. In addition, India can offer assistance in the form of experts for field posts and teaching in tropical forestry, particularly in the fields of silviculture, management, timber mechanics, utilisation of forest products, survey of forest resources, etc.

International Collaboration in Research

64.3.24 In agricultural research it is necessary to have a worldwide collaboration programme. The best course for this would be to have arrangements with international organisations, institutions, foundations and bilateral agencies whereby foreign scientists could work in Indian research institutions and Indian scientists in the research institutions abroad. This kind of give and take is a regular feature in the scientific world and India should fully utilise this arrangement for enlarging her knowledge and developing her research.

64.3.25 A Consultative Group on International Agricultural Research was organised in 1971 to review the needs of developing countries for special efforts in agricultural research at international and regional levels on subjects not likely to be covered by existing efforts, and to provide financing for such special efforts. The Group has been organised under the Chairmanship of the World Bank. FAO and UNDP are co-sponsors. Among the members, there are five representatives of developing areas chosen by the membership

of FAO. The Group is supporting a number of international agricultural research centres, one of which is in India, viz., International Crops Research Institute for the Semi-arid Tropics. The research network has been scientifically productive and of help to developing nations including India. We consider this to be a development in the right direction.

64.3.26 The increasing collaboration among the agricultural scientists working in research institutions in different parts of the world has been an important factor in the development of new techniques and processes of agricultural production. It will be of immense advantage to India to participate fully in this growing international brotherhood. In particular, close relationship should be developed with International Research Institutes on wheat and maize in Mexico, rice in Philippines, potato in Peru and tropical agriculture in Columbia and Nigeria. The International Crop Research Institute for Semi-arid Tropics is already located in Hyderabad. In addition, reciprocal arrangements between Indian agricultural universities and research institutes and similar institutions in other countries should be developed. It will also be beneficial to India to make a greater use of multilateral aid for strengthening her research infra-structure.

World Bank—Third Window Aid

64.3.27 As far as financial aid for agricultural programme is concerned, the Development Committee of the World Bank decided in June, 1975 to open a "Third Window" for lending funds to the developing countries at a very moderate rate of interest and thus a new intermediate financing facility started functioning from July 1, 1975. Under this facility soft loans would be given to the developing member countries of the Bank whose per capita income is less than \$ 350 a year. The terms of the "Third Window" loans would be on an intermediate level between the standard terms of lending (8.5 per cent) by the World Bank and the highly concessional terms of credit from the International Development Association (IDA). The "Third Window" has a working capital of \$ 500 million and the interest rate on the loans is expected to be about 4.5 per cent per annum. India could take advantage of these funds for some of her agricultural development programmes.

World Food Council

64.3.28 The World Food Conference, held in Rome in Novem-

ber, 1974 has recognised the need for improved institutional arrangements to increase world food production, maintain world food security, improve world food trade and ensure that timely action is taken to meet the threat of acute food shortage or famines in the different developing regions. It called upon the General Assembly of the United Nations to establish a World Food Council at the ministerial or plenipotentiary level to function as an organ of the United Nations. The World Food Council has since been established. The foremost task set for the Council is to promote concerted efforts to accelerate the increase in food production in the developing countries, particularly the most seriously affected countries, through larger investment, assured supply of inputs, expanded research support and improved policies and services. Other important objectives of the Council include ensuring availability of food to the most seriously affected countries and the establishment of an international fund for agricultural development. The World Food Council will also review the major problems and policy issues affecting the world food situation and the steps being taken to resolve them by the various governments and the United Nations' central and regional organisations and recommend appropriate remedial action. An amount of \$ 5.0 billion a year is proposed to be allocated to the Council to enable it to fulfil its objectives. In pursuance of the recommendations of the World Food Conference a proposal to set up a \$1200 million International Agricultural Development Fund to assist the developing countries to increase their food production is under consideration. India should take advantage of the assistance available from the Fund.

Regional Cooperation

64.3.29 For the countries of Asia the agency which seeks to promote regional cooperation is the United Nations' Economic and Social Commission for Asia and the Pacific (ESCAP). The Commission has made cooperative arrangements in commodities like rice, coconut, pepper, jute and rubber through the establishment of the following organisations:

- (i) Asian Rice Trade Fund.
- (ii) Asian Coconut Community.
- (iii) Asian Pepper Community.
- (iv) Jute International.
- (v) Association of Natural Rubber Producing Countries.

64.3.30 The Asian Rice Trade Fund was established in Decem-

ber, 1974 with the membership of Bangladesh, India and Sri Lanka. This fund has yet to start its operations effectively. The Asian Coconut Community was set up in September, 1969 to promote, coordinate and harmonise all activities of the coconut industry with a view to achieve the maximum economic development of the industry. A permanent panel on Coconut Production and Productivity (Cocopap) was set up with the aid of the UNDP for finding out priorities in increasing coconut production. The Asian Coconut Community is making valuable contribution to the development of coconut industry. The Asian Pepper Community was set up in 1971 to help research, development and marketing of pepper through the cooperation of the member countries, India being one of them. One Pepper Research Centre is proposed to be set up with the assistance of the UNDP.

64.3.31 The idea of forming 'Jute International' was mooted at a conference of jute producing countries held in Dacca in 1973. The proposal materialised at the second conference held in New Delhi in October, 1975. India, Bangladesh and Nepal are members of the Jute International. Burma and Thailand are expected to join the organisation. Its main objective is to develop a strong and expanding demand for jute and jute manufactures and to maximise their consumption. An annual budget of the equivalent of \$ 10 million has been earmarked for the organisation. The organisation has, however, yet to start its operations. The Association of Natural Rubber Producing Countries (ANRPC) consists of the countries of the South-East Asian region producing natural rubber. India, Indonesia, Malaysia and Thailand are its members. The main objectives of the Association are to stabilise the prices of natural rubber by regulating and rationalising its supply on a regional basis and to enhance the bargaining capacity of its members for getting a better deal from the advanced importing countries.

64.3.32 Proposals for action to promote small-scale mechanisation of farming and to strengthen the bargaining capacity of governments in negotiating transfer of technology were considered at a meeting of Asian and Pacific farm and industrial experts and economists in Bangkok recently. Similar proposals for regional cooperation for fertilisers, coarse grains and pulses are under consideration. India has been an active member in all these cooperative arrangements.

64.3.33 Another regional organisation, through which India has extended her cooperation, is the Asian Development Bank. It is a regional institution of development finance and has the functions of lending funds and promoting investment, and providing technical assis-

tance to developing member countries. India is one of the major contributors to the Bank's funds and a participant in the Bank's functions.

4 SUMMARY OF RECOMMENDATIONS

64.4.1 The main recommendations in the sphere of International Cooperation are briefly given below:

1. In view of the availability of a very large range of plant material to the modern plant-breeder, it is necessary for the Indian breeder to keep himself abreast of the latest developments. For this purpose, international and inter-regional cooperation in plant breeding through multi-disciplinary research in specific crops and seed exchange programmes will be required. The existing arrangements in this field need to be strengthened.

(Paragraph 64.3.6)

2. Foreign assistance will be necessary for the purchase of sophisticated laboratory, seed testing and cleaning, storage and disinfection equipment which is not available in India.

(Paragraph 64.3.7)

3. There is need for further foreign assistance for the import of fertilisers and pesticides (technical grades) not manufactured in India and of raw materials, plant and machinery required for the manufacture of these inputs till we are able to achieve self-reliance. Foreign assistance will also be needed for research on the most effective and/or economical use of material and formulations, and forecasting and control of pests and plant diseases.

(Paragraph 64.3.9)

4. In the field of animal husbandry, it would be useful to have further foreign collaboration to build up animal industry on scientific lines. The areas where foreign collaboration is needed are the setting up of plants to manufacture foot-and-mouth disease vaccine, and supply of high-producing milch animals, equipment for the establishment of frozen semen stations, fine wool and mutton breeds of sheep, high quality foundation breeding stock of pigs and the pure live poultry-breeding stock.

(Paragraph 64.3.10)

5. In the field of fisheries there is still need for development of purseining and other methods of pelagic fishing. Technological advice and assistance are also required for mid-water trawling and tuna fishing.

(Paragraph 64.3.11)

6. Since the available sources of bamboo in India cannot alone provide the range of fibres required for the pulp and paper industry, part of the future long-fibre needs will have to be met both from the existing coniferous forests and by establishing tropical pine plantations for meeting the requirements of this industry. India's experience in this regard being limited, bilateral and/or multilateral assistance for the supply of seeds and trial of tropical pine species will be required.

(Paragraph 64.3.12)

7. Development of wild life is another area where advantage can be taken of the expertise available with international agencies, like the FAO, World Wildlife Fund, the International Union for the Conservation of Nature, etc.

(Paragraph 64.3.15)

8. A greater use of latest developments in remotesensing and infra-red photography will be useful for detecting plant diseases and assessing soil characteristics. This will need import of sophisticated equipment and foreign expertise for guiding and training Indian personnel.

(Paragraph 64.3.16)

9. India's future need for foreign expertise will be mostly in the fields of advanced production technology, research and training. The foreign experts will, however, be needed more as consultants than as regular, whole-time advisers.

(Paragraph 64.3.17)

10. International cooperation need not necessarily be in one direction only. India can also contribute significantly both in agricultural research and production. In the field of crop production, it should be part of India's policy to provide seed to other countries where needed. In respect of fertilisers and pesticides, India can provide experts and training facilities.

(Paragraph 64.3.19)

11. In the field of irrigation, India is in a position to assist in conducting feasibility studies and preparation of project reports, provide consultants, depute irrigation engineers and offer fellowships for training in India. India can also undertake turn-key jobs for constructing irrigation projects.

(Paragraph 64.3.20)

12. In respect of animal husbandry India can render assistance in establishing biological production stations for the manufacture of vaccines and diagnostic agents, disease investigation laboratories, animal science teaching and research institutions, installing dairy and feed mixing plants on turn-key basis and setting up livestock farms.

(Paragraph 64.3.21)

13. As the largest fishing nation in the Indian Ocean area, India should undertake cooperative research and investigations with the neighbouring countries in subjects of common interest. Research institutions in marine fisheries and oceanography should also be fully equipped to handle this task.

(Paragraph 64.3.22)

14. In forestry, India can continue to provide facilities for education and training to students from other countries. In addition, India can offer assistance in the form of experts for field posts and teaching in tropical forestry.

(Paragraph 64.3.23)

15. In agricultural research there is need for world-wide collaboration programme through arrangements with international organisations, institutions, foundations and bilateral agencies, whereby foreign scientists could work in Indian research institutions and Indian scientists in the research institutions abroad.

(Paragraph 64.3.24)

16. Close relationship should, in particular, be developed with International Research Institutes on wheat and maize in Mexico, rice in Philippines, potato in Peru and tropical agriculture in Columbia and Nigeria.

(Paragraph 64.3.26)

APPENDIX 64.1

(Paragraph 64.2.43)

Assignment of Agricultural Experts to India[†] 1951-73[†]

Sl. No.	Field	FAO/ UNDP	USAID	Colombo Plan	Bilateral Countries	Total
1.	Agricultural Research and Education	40	397	..	..	437
2.	Agri. Planning (Economics and Statistics)	19	5	..	20	44
3.	Agri. Extension and Home Science	24	68	7	53	152
4.	Agri. Engg. and Machinery	16	19	6	9	50
5.	Agricultural Marketing	..	..	..	..	..
6.	Animal Husbandry	119	5	2	17	143
7.	Dairy Development	68	8	19	3	98
8.	Poultry Development	8	5	1	..	14
9.	Sheep and Wool Development	40	..	7	3	50
10.	Fertilisers	1	13	1	3	18
11.	Fisheries	107	9	16	19	151
12.	Forestry	81	3	..	4	88
13.	Horticulture	15	..	5	..	20
14.	Irrigation & Drainage	20	32	..	6	58
15.	Soil & Water Conservation	45	45	5	1	96
16.	Nutrition	..	..	..	..	..
17.	Plant Protection	14	1	5	..	20
18.	Seed/Crop Production	24	38	4	1	67
19.	Storage	..	..	..	..	..
20.	Others	48	15	1	7	71
Total		689	663	79	146	1628*

[†]Department of Agriculture, Ministry of Agriculture and Irrigation.

*The total includes 51 experts assigned by the non-official agencies who have not been classified field-wise in the above table.

APPENDIX 64.2

(Paragraph 64.2.43)

Fellowships Granted to Indian Personnel for Training Abroad, 1951—73†

Field	USAID*	Colombo Plan	FAO/UNDP	Total
Agricultural Research and Education •	816	38	26	880
Agri. Planning (Economics and Statistics)	**	27	12	39
Agri. Extension and Home Science •	352	39	5	396
Agri. Engineering & Machinery •	**	27	4	31
Agricultural Marketing • • •	**	12	5	17
Animal Husbandry • • • •	111	88	99	585
Dairy Development • • •		97	66	
Poultry Development • • •		34	8	
Sheep & Wool Development • • •		72	10	
Fertilisers • • • • •	249	..	..	249
Fisheries • • • • •	**	59	25	84
Forestry • • • • •	**	160	52	212
Horticulture • • • • •	**	7	5	12
Irrigation & Drainage • • •	**	12	16	28
Soil and Water Conservation • •	272	26	22	320
Nutrition • • • • •	..	5	7	12
Plant Protection • • • • •	**	120	7	127
Seed/Crop Production • • •	168	23	21	212
Storage • • • • •	**	5	4	9
Others • • • • •	77	154	92	323
Total • • • • •	2045	1005	486	3720@

Department of Agriculture, Ministry of Agriculture and Irrigation.

*Based on information given in the Directory of Returned USAID Participants, 1951—71.

**Separate figures not indicated in the Directory of Returned USAID Participants, 1951—71.

@Includes 184 trainees sent abroad under bilateral aid programmes, not classified field-wise in the above table.

ERRATA

PART XIV—PLANNING, STATISTICS AND ADMINISTRATION

Page No.	Paragraph/ Table/Rec. No.]	Line	As printed	As desired
1	2	3	4	5
1	60.1.2	14	facilities	facilitates
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130	61.19.9	3 sanctioning time		sanctioning from time
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141	30	2 livestock fed		livestock feed
149	Heading	Definition		Definiticns
150	Appendix 61.1	Col. 2 included Line 4		are included
157		$C_t - I = \frac{C_t}{\frac{(1+R)}{100}}$		$C_t - I = \frac{C_t}{1 + \frac{R}{100}}$
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163	Appendix 61.7	item at 12 line.1		as
164	—Do—	item 17 'Khul' line 7		'Kuhl'
168	Appendix 61.8 Tab. 3	Col. 2 on storage scheme(s)		cr storage scheme(s)
171	Appendix 61.8 Tab 4	Col. 3 supplied		supplies
173	Appendix 61.8 Tab. 5	Col. 6-7		Main heading to be read as "Delta at distributary head"
174	Appendix 61.8 Tab. 6	Col. 1 Heading		Serial No.
175	Appendix 61.9	B(ii) plant built		plank built
176	Appendix 61.10	Title Forests		Forest
201	footnote	1 agriculturande		agriculture and
208	62.4.16	3 on		of
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222	62.5.7	5 India		India and
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230	62.5.19	3 scheme		schemes
239	62.5.43	1 quality		duality
243	62.6.2	1 the Chapter		in Chapter
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261	63.2.13	2 organisation		organisations
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321	Appendix 64.2	foot note	Department	†Department